

1.

<b>ArticleType</b>	Journal Article
<b>Title</b>	Hydropedology and ecohydrology of the Brigalow Belt, Australia: opportunities for ecosystem rehabilitation in semi-arid environments
<b>Authors</b>	Arnold, S; Audet, P; Doley, D; Baumgartl, T
<b>Year</b>	2013
<b>Journal</b>	Vadose Zone Journal
<b>Volume</b>	12
<b>Issue</b>	4
<b>Abstract_Summary</b>	The Brigalow Belt Bioregion - located between the sub-tropical coastline and semi-arid interior of eastern Australia - is a unique ecological area characterized by non/cracking clay soils that have high water-holding capacities, and rainfall patterns that are spatio-temporally erratic and unpredictable. These attributes have resulted in highly variable water-supply conditions defined by alternating periods of intense rainfall and prolonged drought to which open-forests and woodlands dominated by endemic Brigalow ( <i>Acacia harpophylla</i> ) plant communities are best adapted. Since the 1950s, most of the Brigalow woodland has been cleared for agriculture and now coal mining developments, therefore very little of the pre-disturbance vegetation today remains. The primary goal of landscape rehabilitation currently targets the re-establishment of native Brigalow plant communities in hopes of achieving stable and self-sustaining ecosystems. However, very few reference ecosystems exist from which to determine essential ecological structure and function. Therefore, restoration practitioners are faced with the daunting task of reconstructing landforms and ecosystems that are characteristic of the bioregion's distinct environmental conditions. Here, we examine the fundamental hydropedological and ecohydrological relationships that define the function of natural Brigalow ecosystems. We propose these relationships as the cornerstone for rehabilitation of semi-arid environments and suggest applying investigative methods of related disciplines within a unifying modeling framework (grey box) to promote the development of native plants in the Brigalow Belt. This is particularly critical where model parameterization may span a broad ecological organizational scale or where there are knowledge gaps within the model framework.

2.

<b>ArticleType</b>	Proceedings
<b>Title</b>	Effect of water potential on germination of seeds in ecosystem restoration, Brigalow Belt, Queensland, Australia
<b>Authors</b>	Arnold, S; Knauer, J; Baiquni, H; Baumgartl, T
<b>Year</b>	2012
<b>Editor</b>	Burkitt LL and LA Sparrow
<b>Name</b>	5th Joint Australian and New Zealand Soil Science Conference: Soil solutions for diverse landscapes
<b>Location</b>	Hobart, Australia
<b>NumberOfPages</b>	4
<b>PageRange</b>	43-46
<b>Date</b>	2-7 December 2012
<b>Publisher</b>	Australian Society of Soil Science Inc.
<b>Sponsor</b>	Australian Government: Australian Centre for International Agricultural Research
<b>Abstract_Summary</b>	We investigated the effect of water potential on seed germination of native species occurring in the Brigalow Belt - a semi-arid bioregion of Queensland and New South Wales, Australia. Seeds were germinated in PEG 6000 solution at nine osmotic potentials including equivalents of soil water conditions at saturation, field capacity, and permanent wilting point. Two species co-dominating the plant communities in the Brigalow Belt were used - <i>Eucalyptus populnea</i> (Poplar box or Bimble box) and <i>Casuarina cristata</i> (belah). The germination rate of <i>C. cristata</i> was generally lower for the entire range of water potentials. The water potential that maximised germination of <i>C. cristata</i> corresponded to soil water potential at field capacity (-30 to -10kPa). On the other hand, germination of <i>E. populnea</i> decreased continuously with decreasing water potential and germination was even observed for water potential as low as -1000kPa. These results are expected to be useful for physiological parameterisation of ecohydrological models. Strategies using <i>E. populnea</i> on post-mining areas rather than <i>C. cristata</i> might be more robust in the

face of erratic rainfall events occurring in the Brigalow Belt.

3.

<b>ArticleType</b>	Journal Article
<b>Title</b>	Ecohydrological feedback as a land restoration tool in the semi-arid Brigalow Belt, QLD, Australia
<b>Authors</b>	Arnold, S; Thornton, C; Baumgartl, T
<b>Year</b>	2012
<b>Journal</b>	Agriculture, Ecosystems and Environment
<b>Volume</b>	163
<b>PageRange</b>	61-71
<b>Abstract_Summary</b>	In this study of native plant communities in the Brigalow Belt – a semi-arid bioregion of Queensland and New South Wales, Australia – an ecohydrological model was designed to investigate the complex feedback relationships existing between plant community traits and soil water dynamics among post-disturbance (i.e. mining and agricultural) landscapes. Two distinct locations (having similar composition and climatic environment, yet different soil water dynamics) were selected to compare the interaction and sensitivity of these traits toward water evaporation from soil or from plant transpiration. The model is constrained by soil physical attributes and climate data monitored at the Brigalow Catchment Study, and plant community parameters were derived using Latin hypercube sampling and pattern oriented modelling. Our findings indicate that, under the given soil-climate constraint, plant communities could only thrive if they were able to avoid prolonged periods of water stress (e.g., by minimising their physiological wilting point). Further, the influence of vegetation dynamics on evaporation from soil was deemed to be critical for the simulated soil water dynamics, whereas plant transpiration affected soil moisture only marginally. Moreover, both monitoring sites were dominated by the same species but co-dominated by different tree species, suggesting that evaporation from soil was probably influenced by the co-dominant species, whereas transpiration was probably controlled by the dominant species. For the re-establishment of native plant communities on post-mined landscapes and for agro-forestry and resource management in the Brigalow Belt, this implies that inherent ecosystem processes exist, which control plant community development and, hence, ecohydrological functions such as regulation of evapotranspiration. Therefore, restoration strategies should carefully reflect on species composition and their ecohydrological functions rather than attempting to re-establish the pre-disturbance ecosystem form and function - which could be less robust and even unsuccessful given post-disturbance conditions and under altered soil conditions of post-mined landscapes or the uncertainty of future climatic environments.

4.

<b>ArticleType</b>	Report
<b>Title</b>	Vegetation Assessment of a Brigalow-Dawson Gum Community at Norwich Park Coal Mine
<b>Authors</b>	Bowen, D; Taylor, P A; Annandale, M G; Mulligan, D R
<b>Year</b>	1997
<b>PageRange</b>	21
<b>Publisher</b>	University of Queensland
<b>PlacePublished</b>	Brisbane
<b>TypeOfArticle</b>	QLD
<b>AccessDate</b>	27/01/04
<b>Keywords</b>	mine rehabilitation; revegetation; Brigalow; Queensland; Bowen Basin; Norwich Park mine; coal; native species
<b>Notes</b>	Report Type: Report to BHP Coal Pty Ltd. An overview of the Brigalow community ecology. The aims of the report are to: produce an inventory of plant species and generate data on species frequencies, densities and variation across the site; and provide data useful for rehabilitation of the site at Norwich Park and adjacent mined areas. This report provides the results of the vegetation survey together with a photographic inventory of the plant species present.

5.

<b>ArticleType</b>	Proceedings
<b>Title</b>	Successional change and Brigalow pastures

**Authors** Burrows, W  
**Year** 2000  
**BookTitle** Buffel Grass Workshop  
**Date** Feb-00  
**Publisher** QDPI  
**PlacePublished** Theodore  
**TypeOfArticle** QLD  
**AccessDate** 11/11/03  
**Keywords** pasture; grasses; soil; Bowen Basin; Central Queensland; succession; Brigalow

6.

**ArticleType** Journal Article  
**Title** Surface Soil Chemical and Physical Patterns in a Brigalow-Dawson Gum Forest, Central Queensland  
**Authors** Dowling, A J; Webb, A; Scanlan, J C  
**Year** 1986  
**Journal** Australian Journal of Ecology  
**Volume** 11  
**Issue** 2  
**PageRange** 155-162  
**ISBN\_ISSN** ISSN:0307-692X  
**TypeOfArticle** QLD  
**AccessDate** 16/03/04  
**Keywords** soil; chemical analysis; Brigalow; Central Queensland; forest  
**Notes** Author Address: DOWLING AJ, QUEENSLAND DEPT PRIMARY IND, MEIERS RD, INDOOROOPIILLY, QLD 4068, AUSTRALIA  
**URL** [www.ingenta.com/journals/browse/bsc/aec](http://www.ingenta.com/journals/browse/bsc/aec)

7.

**ArticleType** Book Section  
**Title** Fauna of the Brigalow Belt  
**Authors** Gordon, G  
**Year** 1984  
**BookTitle** The Brigalow Belt of Australia  
**Editor** Bailey, A  
**PageRange** 61-70  
**Publisher** Royal Society of Queensland

**PlacePublished** Brisbane

**ISBN\_ISSN** ISBN: 0 7242 2272 3

**TypeOfArticle** QLD

**AccessDate** 15/01/04

**Keywords** Bowen Basin; landscapes; Queensland; Brigalow; fauna

**Notes** Project: DPI Conference and Workshop Series QC84003

8.

**ArticleType** Thesis

**Title** Soil nitrogen status in relation to land development and pasture productivity in the Brigalow region of central Queensland

**Authors** Graham, T W G

**Year** 1978

**Institution** The University of Queensland

**PlacePublished** Brisbane

**TypeOfArticle** QLD

**AccessDate** 31/03/04

**Keywords** pasture; soil; Brigalow; nutrients; land use; Central Queensland

**Notes** Report Type: Master of Agricultural Science Call Number: THE1714

9.

**ArticleType** Book Section

**Title** Soil landscapes of the Brigalow Belt in Queensland

**Authors** Gunn, R

**Year** 1984

**BookTitle** The Brigalow Belt of Australia

**Editor** Bailey, A

**Publisher** Royal Society of Queensland

**PlacePublished** Brisbane

**ISBN\_ISSN** ISBN: 0 7242 2272 3

**TypeOfArticle** QLD

**AccessDate** 15/01/04

**Keywords** Bowen Basin; landscapes; soil; Queensland; Brigalow

**Notes** Project: DPI Conference and Workshop Series QC84003

10.

**ArticleType** Book

**Title** Soils and Vegetation of the Brigalow Lands, Eastern Australia

**Authors** Isbell, R F

**Year** 1962

**BookTitle** Soils and Land Use Series

**Volume** 43

**Publisher** CSIRO, Division of Soils

**PlacePublished** Melbourne

**TypeOfArticle** QLD

**AccessDate** 24/03/04

**Keywords** soils; historical survey; land use; vegetation; Central Queensland

11.

**ArticleType** Book Section

**Title** The impact of clearing on Brigalow communities and consequences for conservation

**Authors** Johnson, R W

**Year** 1997

**BookTitle** Conservation Outside Nature Reserves

**Editor** Hale, P; Lamb, D

**PageRange** 359-363

**Publisher** Centre for Conservation Biology, University of Queensland

**PlacePublished** Brisbane

**ISBN\_ISSN** ISBN: 086776 728 6

**TypeOfArticle** QLD

**AccessDate** 14/01/04

**Keywords** flora; ecology; conservation; biodiversity; Brigalow; Queensland

12.

**ArticleType** Report

**Title** Ecology and Control of Brigalow in Queensland

**Authors** Johnson, R W

**Year** 1964

**PageRange** 92

**Publisher** Department of Primary Industries

**PlacePublished** Brisbane

**TypeOfArticle** QLD

**AccessDate** 14/01/04

**Keywords** ecology; botany; Brigalow; Queensland; native species; environmental management

**Notes** Report Type: Report This publication contains the results of a survey commenced in May 1958 to collect and collate information already available on the present methods of Brigalow clearing, and gives additional information from published and unpublished reports. Survey of ecology of Brigalow communities and ways to clear the Brigalow. Promotes growing non-native Rhodes grass.

13.

**ArticleType** Proceedings

**Title** The impact of clearing on Brigalow communities and consequences for conservation

**Authors** Johnson, R W

**Year** 1996

**BookTitle** Ecologically Sustainable Management and Rehabilitation of Brigalow Communities Workshop

**Date** March, 1996

**Publisher** University of Queensland

**PlacePublished** Brisbane

**TypeOfArticle** QLD

**AccessDate** 11/11/03

**Keywords** Bowen Basin; Brigalow; Queensland; grasses; conservation; rehabilitation

14.

**ArticleType** Book Section

**Title** Flora and Vegetation of the Brigalow Belt

**Authors** Johnson, R W

**Year** 1984

**BookTitle** The Brigalow Belt of Australia

**Editor** Bailey, A

**PageRange** 41-59

**Publisher** Royal Society of Queensland

**PlacePublished** Brisbane

**ISBN\_ISSN** ISBN: 0 7242 2272

**TypeOfArticle** QLD

**AccessDate** 15/01/04

**Keywords** Brigalow; vegetation; acacia; native grasses; vine thickets; Queensland; Bowen Basin

**Notes** Project: DPI Conference and Workshop Series QC84003

15.

**ArticleType** Journal Article

**Title** Studies of a Vegetation Transect Through Brigalow (*Acacia harpophylla*) Forest in Central Queensland

**Authors** Johnson, R W

**Year** 1980

**Journal** Australian Journal of Ecology

**Volume** 5

**Issue** 3

**PageRange** 287-307

**ISBN\_ISSN** ISSN:0307-692X

**TypeOfArticle** QLD

**AccessDate** 16/03/04

**Keywords** acacia; native species; monitoring; revegetation; Central Queensland

**Notes** Author Address: JOHNSON RW, QUEENSLAND DEPT PRIMARY IND,BOT BRANCH,MEIERS RD,BRISBANE,QLD 4000,AUSTRALIA

**URL** [www.ingenta.com/journals/browse/bsc/aec](http://www.ingenta.com/journals/browse/bsc/aec)

16.

**ArticleType** Report

**Title** Soil and Climatic Data for the Brigalow Lands, Eastern Australia

**Authors** Reeve, R; Isbell, R F; Hubble, G D

**Year** 1963

**ReportNumber** Divisional Report No. 7/61

**Publisher** CSIRO Division of Soils

**TypeOfArticle** QLD

**AccessDate** 31/03/04

**Keywords** soil; characteristics; Brigalow; Central Queensland

17.

**ArticleType** Journal Article

**Title** The effects of temperature and salinity on Acacia harpophylla (brigalow) (Mimosaceae) germination

**Authors** Reichman, S M; Bellairs, S M; Mulligan, D R

**Year** 2006

**Journal** Rangeland Journal

**Volume** 28

**Issue** 2

**PageRange** 175-178

**Publisher** CSIRO

**ISBN\_ISSN** 10369872

**AccessDate** 02/02/2011

**Keywords** seed germination; temperature; salinity; *Acacia harpophylla*

**Abstract\_Summary** *Acacia harpophylla* F. Muell. (brigalow) used to naturally occur over a range of about 50 000 km<sup>2</sup> in Queensland and New South Wales, Australia. Large scale clearing for agriculture has reduced the area to less than 20 000 km<sup>2</sup> and it is estimated that 20-25% of vertebrate fauna living in brigalow communities will become locally extinct as a result of the current clearing induced loss of habitat. Some coal mining companies in central Queensland have become interested in providing habitat for the endangered bridle nail-tailed wallaby that lives in brigalow vegetation. However, there is little known about establishment techniques for brigalow on mine sites and other disturbed ground; an understanding of brigalow biology and ecology is required to assist in the conservation of this threatened vegetation community and for re-creation of bridled nail-tail wallaby habitat in the post mining landscape. Brigalow is an unusual species of *Acacia* because it is not hard-seeded and germinates readily without the need to break seed-coat imposed dormancy. Germination trials were undertaken to test the ability of brigalow seed to germinate with a range of temperatures and salinity levels similar to those experienced in coal mine spoil. Optimum germination was found to occur at temperatures from 15 to 38°C and no germination was recorded at 45°C. Brigalow was very tolerant of high salt levels and germinated at percentages greater than 50% up to the highest salinity tested, 30 dS/m. Germination of greater than 90% occurred up to an electrical conductivity of 20 dS/m. The results indicate brigalow seed can be sown in summer when rains are most likely to occur, however, shading of the seed with extra soil or mulch may ensure the ground surface does not become too hot for germination. Because of its ability to germinate at high salinity levels, brigalow may be suitable for use in saline mine wastes which are common on sites to be rehabilitated after mining. © The Rangeland Society.

18.

**ArticleType** Book Section

**Title** Conservation Status of Brigalow (*Acacia harpophylla*) communities in Queensland

**Authors** Sattler, P S; Webster, R J

**Year** 1984

**BookTitle** The Brigalow Belt of Australia

**Editor** Bailey, A

**PageRange** 149-160

**Publisher** Royal Society of Queensland

**PlacePublished** Brisbane

**ISBN\_ISSN** ISBN: 0 7242 2272 3

**TypeOfArticle** QLD

**AccessDate** 15/01/04

**Keywords** Bowen Basin; landscapes; conservation; Queensland; Brigalow

**Notes** Project: DPI Conference and Workshop Series QC84003 The need for total preservation of remaining softwood communities is indicated. Strategies for conservation.

19.

**ArticleType** Book Section

**Title** Brigalow Belt: Chapter 11

**Authors** Young, P A R; Wilson, B A; McCosker, J C; Fensham, R J; Morgan, G; Taylor, P M

**Year** 1999

**BookTitle** The Conservation Status of Queensland's Bioregional Ecosystems

**Editor** Sattler, P S; Williams, R D

**Publisher** Environmental Protection Agency, Queensland Government

**PlacePublished** Brisbane

**TypeOfArticle** QLD



**AccessDate** 23/03/04

**Keywords** bioregion; vegetation; climate; soil; Brigalow Belt; historic survey; ecosystem; conservation