

GOYDER INSTITUTE MODEL METADATA TEMPLATE

METADATA REQUIRED	DETAILS
Model Name and version	Hydrological niche models for plant functional groups in the South-East of South Australia (8 response curves)
Date of lodgement of Metadata Template.	August 2015
Name of Metadata Provider	David Deane, david.deane@adelaide.edu.au
Goyder Institute Project Number and Name	GOYDER INSTITUTE FOR WATER RESEARCH Project No. E.2.5 Developing ecological response models and determining water requirements for wetlands in the South-East of South Australia
Project Team	Project Leader: Justin Brookes, Justin.brookes@adelaide.edu.au Kane Aldridge, kane.aldridge@adelaide.edu.au Jason Nicol, Jason.nicol@sa.gov.au Claire Harding Claire.harding@sa.gov.au Susan Gehrig susan.gehrig@sa.gov.au David Deane david.deane@adelaide.edu.au
Creator/Developer	Above project team.
Owner/Contact Person and contact details	Contact: David Deane, david.deane@adelaide.edu.au
Model Location	Models are stored at the University of Adelaide on the Staff Shared Drive (S) (file path: S:\Science\BiologicalSciences\Ecol_and_Env_Sci\Brookes\GOYDER\SE_Wetlands) and managed by the limnology group. The leader of this group is Justin Brookes (justin.brookes@adelaide.edu.au , 08 83133747). Within each folder shown above is a folder R_ModAve, which contains separate folders named for the functional group concerned (e.g. Afte, Afrp etc). Within these are the R scripts (text files) and image files with the model objects.
IP or other permission requirements	****REFER TO GOYDER INSTITUTE FOR WATER RESEARCH AGREEMENT **** There are no IP issues associated with data used in developing this model.
Licences associated with model and/or dependencies	****REFER TO GOYDER INSTITUTE FOR WATER RESEARCH AGREEMENT **** <i>Are there any licenses associated with the model and/or the dependencies that future users need to be aware of?</i> Models are built using the open source programming language R and are most simply implemented using this software. Model coefficients are presented in the papers and could be used to implement in a different language if preferred.
Confidentiality agreements associated with model and/or dependencies	<i>Are there any confidentiality agreements associated with the model and/or the dependencies that future users need to be aware of?</i> No

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Brief outline of model	The models are statistical in nature and were built using a generalized linear mixed modelling framework. Error structures are binomial and model outputs are the probability of presence for a given plant functional group for a given mean water level measure. Some response curves used model averaged coefficients and may require more than one water level measure to produce a predicted probability of presence. Only the marginal (fixed effects) responses were used in prediction, allowing for population level responses to inundation.
Area/region covered	The South-East NRM Board region of South Australia
Platform and language and version	<p>Models are implemented in the R programming language (V 3.1.2) and used package MuMIn heavily</p> <p>Model coefficients are presented in the references described below and could be used to implement the models in a different language if preferred.</p>
<p>Dependencies upon:</p> <ul style="list-style-type: none"> i) other models and/or platforms (including version) and location ii) essential data and data sources and location 	<p>No other models are required, although coupling to the output of hydrological models is a useful extension. This would simply involve using the outputs of the hydrological models as inputs to the ecological models.</p> <p>Models require independent variables which represent average water level conditions at the point in space where vegetation presence is to be predicted for the preceding four years. Four different water level variables are required to estimate all of the functional groups:</p> <ul style="list-style-type: none"> (i) Sum Exceedance Values - units of metre-days analogous to degree-days) the annual mean value of the total summed daily depth above ground level; (ii) Maximum inundation depth – units of metres. The maximum inundation depth observed in the four year antecedent period (iii) Maximum depth to groundwater – units of metres - the maximum vertical depth below ground observed in the previous four years (iv) Hydroperiod – units of days – the mean number of days per year that the water level was at or above ground level

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How was model used	The models were used in scenario modelling as an objective means to determine the change in probability of observing a given plant functional group for a given change in the availability of water.
Specificity of data	<p><i>Was data sourced from local field sites or literature</i></p> <p>All data were collected from wetlands located within the region. Case study wetlands are all part of the regional groundwater dependent ecosystem monitoring network. More information on the wetlands where data were collected is presented Goyder Institute Technical Report 15~23 available at: http://goyderinstitute.org/</p>
Datasets/data products produced	<p><i>Include details of where datasets/products are located and contact details in the storage location</i></p> <p>(i) Vegetation data is held at SARDI Aquatic Sciences – contact Jason.nicol@sa.gov.au</p> <p>(ii) Custodian for the water level data is the regional NRM Board – contact Claire.harding@sa.gov.au</p> <p>(iii) Processed data used in model building are held on secure servers (see ‘Model Location’ above for file path) at the University of Adelaide – contact, david.deane@adelaide.edu.au (modeller) OR Justin.brookes@adelaide.edu.au (Project Leader)</p>
Other Information	
Publications (papers and technical reports)	<p><i>Paper presenting the model building process:</i> DEANE, D., NICOL, J., GEHRIG, S., HARDING, C., A., G., ALDRIDGE, K. GOODMAN, A. & BROOKES, J. 2015 Hydrological niche modelling of plant functional groups for regional scale wetland management in South East Australia. Adelaide, South Australia, draft manuscript.</p> <p><i>Paper using the models in scenario modelling:</i> DEANE, D., HARDING, C., GOODMAN, A., GEHRIG, S., NICOL, J., ALDRIDGE, K. & BROOKES, J. 2015 Predicting change in seasonal wetland plant communities as a result of groundwater decline. Adelaide, South Australia, draft manuscript.</p>
Collaborations and acknowledgements	SE NRM Board; SARDI Aquatic Sciences; DEWNR; University of Adelaide
Keywords	hydrological niche model; plant functional groups; groundwater dependent ecosystems