**BIOL5301 Species Distribution Modelling Project**

This project is about generating a real-world quality species distribution model – something you could produce for a job and it would be acceptable. It should focus on 1) building the best model possible, 2) projecting the model in an interesting way, and 3) being very aware of the limitations of the model.

You may choose any terrestrial species to model, but you need to check it with Renee before starting your project. Only one person may do a species in this class. You need to have an interesting question for projecting the model. This could be asking how a species might respond to climate change (will it contract?). You could ask if climate change would make it more likely for an invasive species to establish by modelling it’s distribution outside Australia, then projecting in Australia. There are many options!

**Some helpful hints for species selection:**

* Lots of records from different places is really useful (look in the ALA)
* Modelling narrow range endemic species is hard
* Modelling really really big species is hard and takes a long time (I once ran a global species and it took 3 weeks)
* Species that require very specific habitats (e.g. sphagnum/live on a rock) add a lot of challenge to modelling

**To make a projected model:**

Use the BCCVL Species Distribution Modelling Experiment (<https://support.bccvl.org.au/support/solutions/articles/6000083192-species-distribution-model-experiment>) to build a model of your species. Do it really well!

*Key thing here – the spatial layers in your original model need an equivalent in the future model. So make sure there are matching options. WorldClim layers will be a good starting point.*

Once you have a final version of this model, you then use it to build a future climate model of your species (<https://support.bccvl.org.au/support/solutions/articles/6000083193-climate-change-experiment>). Basically, you are taking your first model, and then projecting it into the future.

**Some considerations:**

If your first version of the model is odd, if a lot of climate layers are not relevant to the species, you may need to run the model more than once, and improve it each time. The result you present is expected to be biologically reasonable. If you include a bunch of climate layers that are not important to the species, you will be marked down.

Modelling decisions you need to make **and justify**:

* How did you clean your distribution data?
* What climate layers did you choose? If you included non-climate layers? And if not, is there any layers that would improve your model but were not available?
* What modelling algorithms did you use, and why are they appropriate?
* What were the buffer zones you set?

**Report format:**

You will submit a report for this project, which should be no more than 1500 words (not including tables and figure captions, or references). It should be concise, clear and accurate – if you can present a clear and accurate description of a sound study in less than 1500 words then please do! The report should have four sections: Introduction, Methods, Results and Discussion, plus appropriate references.

* The Introduction should very briefly introduce the species and question of interest, and finish by clearly stating your aims. A paragraph or at most two should suffice. Ensure you give information about the specific biology of the species, where that information is relevant to the decisions you make about how to model.
* The Methods section should clearly state which modelling decisions you made and why they are appropriate. Note that ideally it should be possible for someone else to do exactly what you did, based on your Methods.
* The Results section should present the results using figures, tables and/or text, as appropriate. It does not have to be long; you may just need a paragraph or two of text referring to the figures/tables. You should provide information on the performance of the model.
* Discussion should include your main conclusions, along with thoughts about what you thought was interesting or surprising or exactly as expected, possible implications, discussion about the limitations of what you did (or of the model itself), and what you would like to do next or would recommend others to do next if the study was replicated.

You are welcome to work with other people as much (or as little) as you like, but you will each need to do a different species. You must write and submit your own report. On average, you should plan to spend at least 18-20 hours total on the project and writing the report. It may take more time depending on how fast you work of course.

I will create a specific forum for questions and discussion about the species distribution modelling project. Please use this in preference to direct email if you think your question may have any general relevance, so that everyone has access to questions and replies.