**RANGE SIZE METHODOLOGY BREAKOUT NOTES**

28 November 2012

Present: *John, Naia, Brian M.*

**Should add additional range modeling methods to the analysis?**

*Bioclim, Mahalanobis, GLM, boosted regression trees, random forests, etc.*

* Would be interesting to create absences by tabulating heavily sampled areas where particular species. (Brian)
* Could do BIOCLIM/GARP model easily without worrying about absences.
* However, overwhelming consensus to use what we have and finish it up; no more modeling methods will be added.

**What is the best way to present accuracy metrics?**

*We have at least 5 accuracy measures for 8 model products for each species*

* Use the best Maxent model that comes from accuracy measures independent of pairwise comparison results and report the statistics for those along with the accuracy measures for other models.
* Is the “best” Maxent model the same as the one from the pairwise comparison with expert map range area?
* For example if evaluation of the best model was Maxent Bioclim+Spatial using a Fixed Threshold, we would produce plots of the accuracy statistics for Latitudinal Band, Bounding Box, Convex Hull, Sum of Point areas and Maxent Bioclim+Spatial Fixed. (See Figures section below).

**Which models we should develop species richness maps from?**

* We will develop richness maps from each modeling method using the best Maxent method obtained from the accuracy statistics (*and perhaps the best one from the range area comparison – if the best model from each analysis is different*).

**What is the best way to quantify differences between species richness maps**

* We will produce maps showing the deltas between richness values derived from overlaying range maps produced with each method and richness values derived from overlaying expert maps.

**Figures for paper**

* *Look up GEB requirements for figures*
* We will produce the following figures for publication in our paper:
* Richness maps – pack into one full page figure (last figure)
* 6 panel box plot – (little area, palm area | little omission/commission, palm omission/commission)
* Multi-panel plot of regression scatterplots through 1,1 (for range size)
* Range size vs. sample size
* Accuracy vs. sample size

**Table for paper**

* We will produce the following table for publication in our paper:
  + Table of pairwise correlations between expert range area and model range areas (see note on calculating R2 below)
  + Pairwise t-test between range areas derived from each method

**Main results to focus on**

* Best method for estimating range size?
* Best method for estimating geographic distribution?
* How does use of different methods effect richness estimates?
* Minimum sample size needed for accurate range size estimates?  
  *(Look for asymptote in plot)*
* Minimum sample size needed for accurate geographic distribution?  
  *(Look for asymptote in plot)*

**List of discussion points**

* How reliable are expert maps?
  + Mexico and Canada problems related to little maps
  + What if there is consistency between methods but the methods don’t match expert maps?

**Notes**

* Methods
* Include mention of our exclusion of cultivars
* Include mention that we had Henrik review palms
* Perhaps see if Bob would help review Little maps (see below) and flag species with major taxonomic changes that would affect our analysis - to be potentially excluded from the analysis.