

Supplementary Material

Assessing the temporal transferability of raptor distribution models: Implications for conservation

LUIS TAPIA, ADRIÁN REGOS, ALBERTO GIL-CARRERA, and JESÚS DOMÍNGUEZ

Contents

Appendix S1. This appendix shows the variable importance for each species, across each modelling algorithm and year, at the scale of 500 meters

Appendix S2. This appendix shows the species-habitat relationship curves resulting from the different methods implemented in biomod2 at the scale of 500 meters, for 2001 and 2014 respectively

Appendix S3. This appendix shows the correlation between each pair of predictors for years 2001 and 2014 to explore the potential effects of multicollinearity on model performance

ASSESSING THE TEMPORAL TRANSFERABILITY OF RAPTOR DISTRIBUTION MODELS: IMPLICATIONS FOR CONSERVATION

TAPIA L.¹, REGOS A.^{1,2,3}, GIL-CARRERA A.⁴ & DOMÍNGUEZ J.¹

Appendix S1. This appendix shows the variable importance for each species, across each modelling algorithm and year, at the scale of 500 meters.

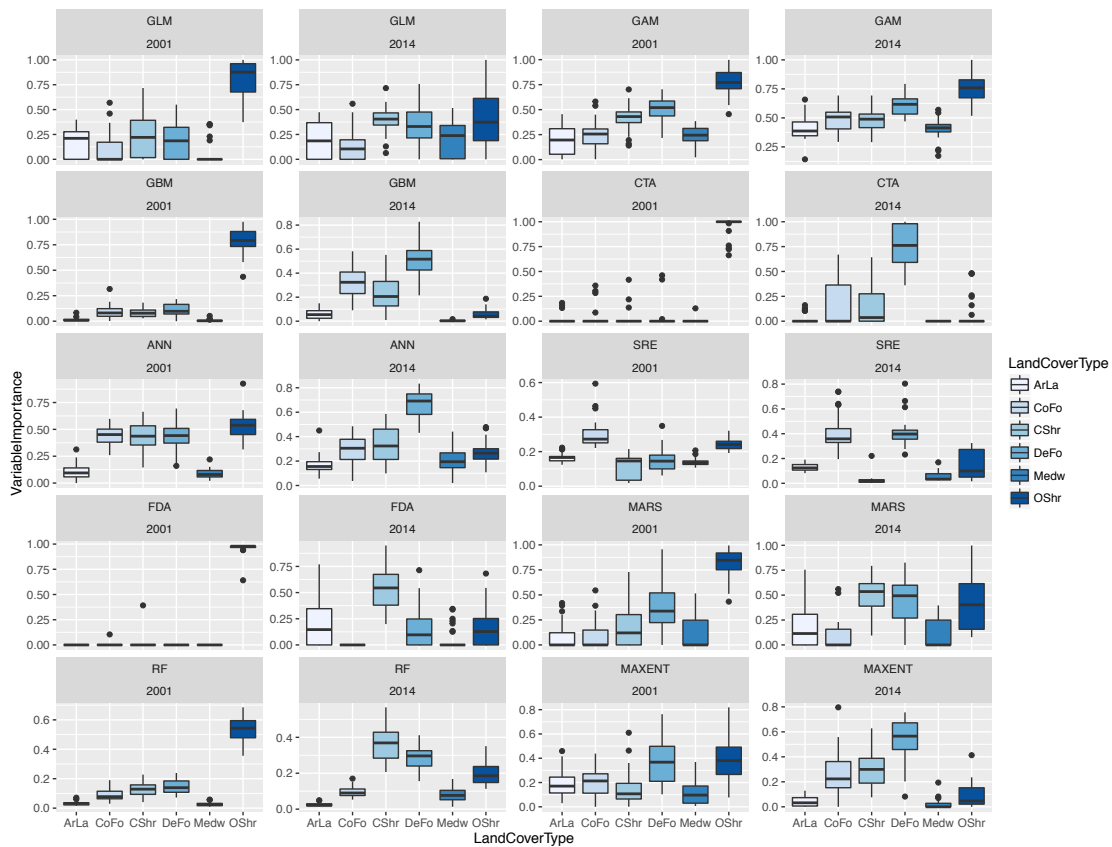


Fig. S1.1. Variable importance for Montagu's harrier (*Circus pygargus*) for each modelling algorithm, year (2001 and 2014) at the scale of 500 meters. Acronyms: Open shrubland (OShr), Deciduous forest (DeFo), Coniferous forest (CoFor), Meadows and fallow land (Medw), Arable or farm land (ArLa), Closed shrubland (CShr); generalized linear models (GLM), generalized additive models (GAM), generalized boosted models (GBM; also known as Boosted Regression Trees, BRT), flexible discriminant analysis (FDA), classification tree analysis (CTA), multivariate adaptive regression splines (MARS), surface range envelope (SRE, a.k.a. BIOCLIM), maximum entropy (MaxEnt), random forest (RF), and artificial neural networks (ANN).

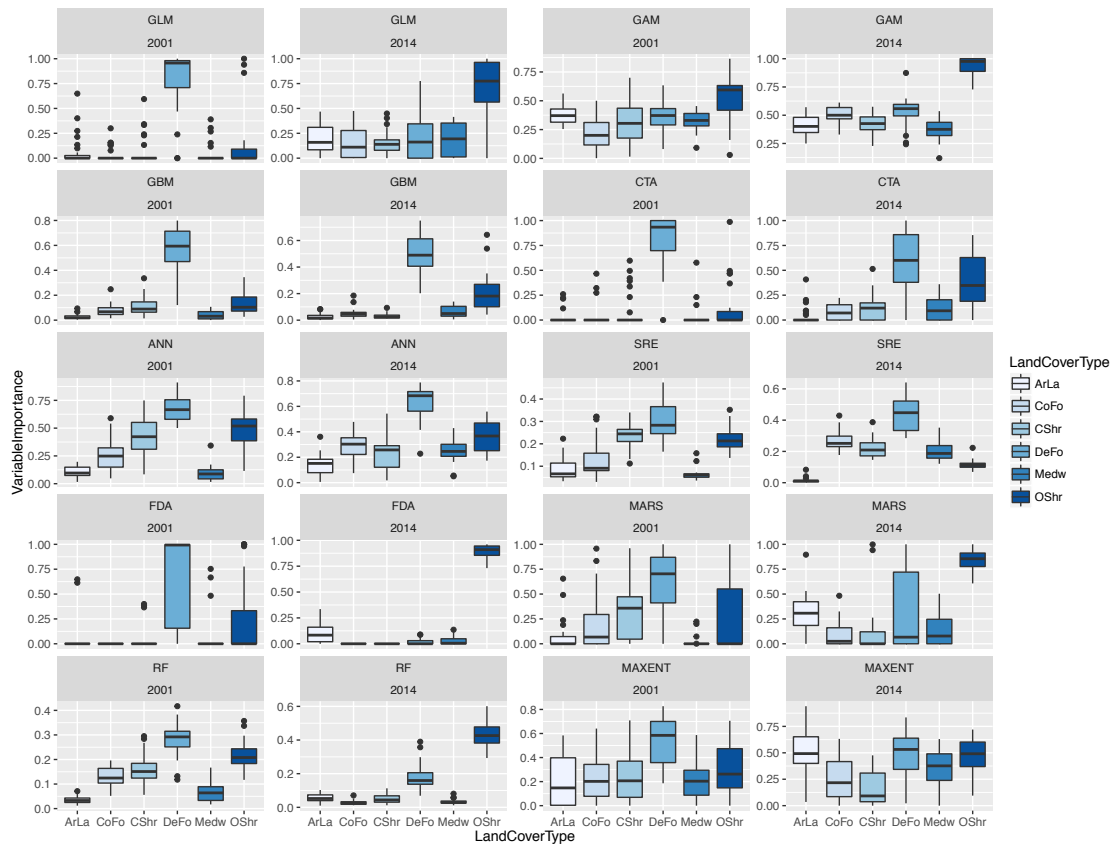


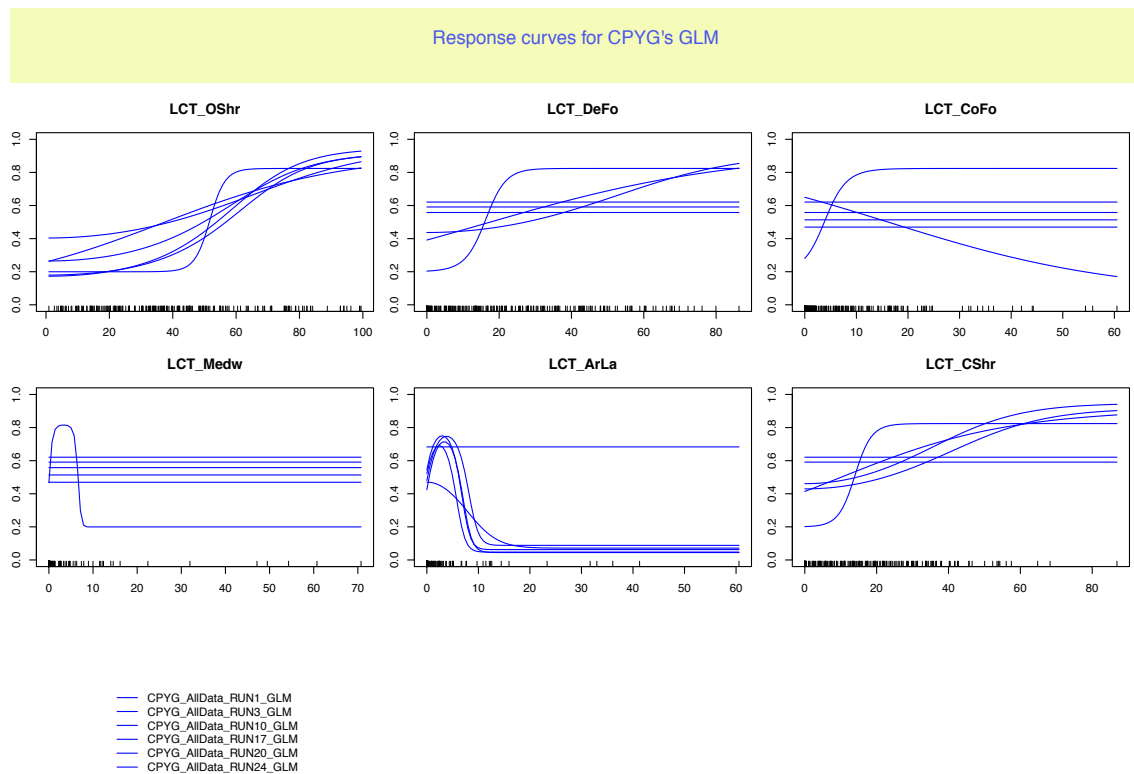
Fig. S1.2. Variable importance for Common kestrel (*Falco tinnunculus*) for each modelling algorithm, year (2001 and 2014) at the scale of 500 meters. Acronyms: Open shrubland (OShr), Deciduous forest (DeFo), Coniferous forest (CoFor, Meadows and fallow land (Medw), Arable or farm land (ArLa), Closed shrubland (CShr); generalized linear models (GLM), generalized additive models (GAM), generalized boosted models (GBM; also known as Boosted Regression Trees, BRT), flexible discriminant analysis (FDA), classification tree analysis (CTA), multivariate adaptive regression splines (MARS), surface range envelope (SRE, a.k.a. BIOCLIM), maximum entropy (MaxEnt), random forest (RF), and artificial neural networks (ANN).

ASSESSING THE TEMPORAL TRANSFERABILITY OF RAPTOR DISTRIBUTION MODELS: IMPLICATIONS FOR CONSERVATION

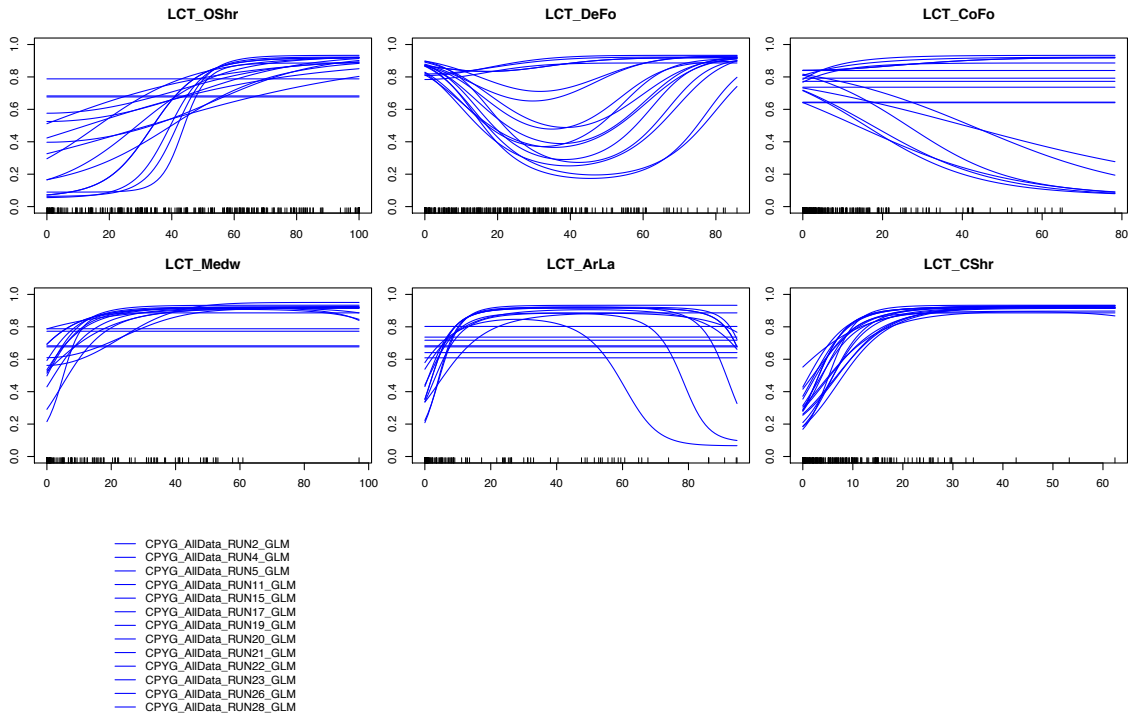
TAPIA L.¹, REGOS A.^{1,2,3}, GIL-CARRERA A.⁴ & DOMÍNGUEZ J.¹

Appendix S2. This appendix shows the species-habitat relationship curves resulting from the different methods implemented in biomod2 at the scale of 500 meters, for 2001 and 2014 respectively.

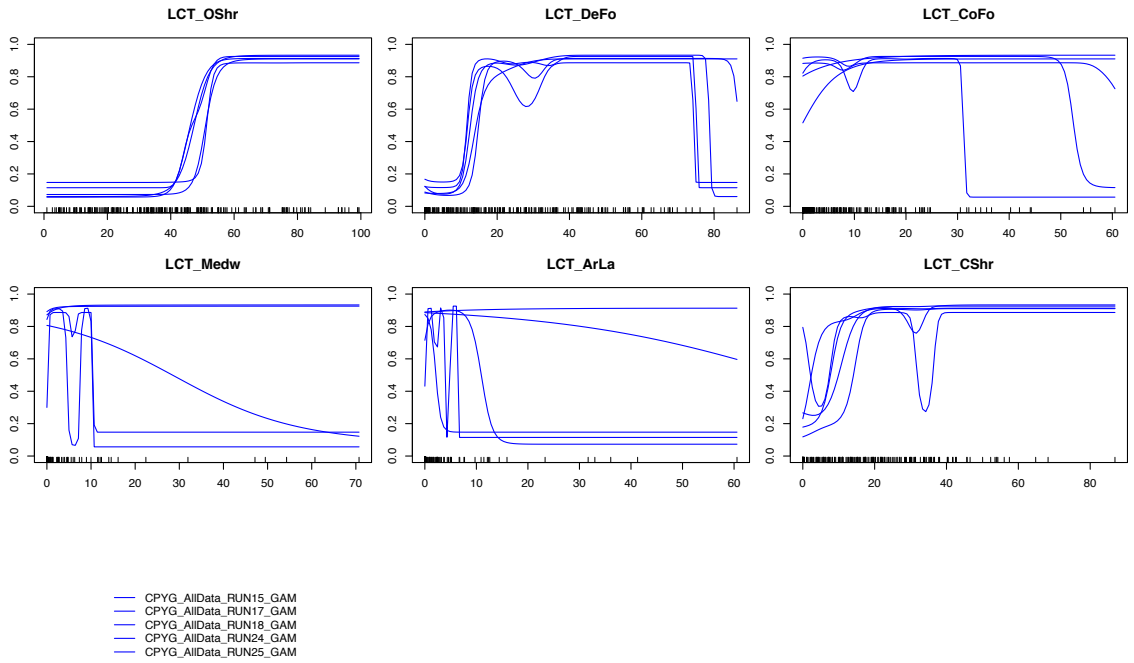
Fig. S2.1. Response curves for Montagu's harrier (*Circus pygargus*) for each modelling algorithm, at the scale of 500 meters for 2001 and 2014 respectively. Acronyms: Open shrubland (LCT_OSshr), Deciduous forest (LCT_DeFo), Coniferous forest (LCT_CoFor), Meadows and fallow land (LCT_Medw), Arable or farm land (LCT_ArLa), Closed shrubland (LCT_CShr); generalized linear models (GLM), generalized additive models (GAM), generalized boosted models (GBM; also known as Boosted Regression Trees, BRT), flexible discriminant analysis (FDA), classification tree analysis (CTA), multivariate adaptive regression splines (MARS), random forest (RF), and artificial neural networks (ANN). Only response curves for those models with AUC values higher than 0.7 are plotted. Response curves for SRE models are not supported yet by biomod2.



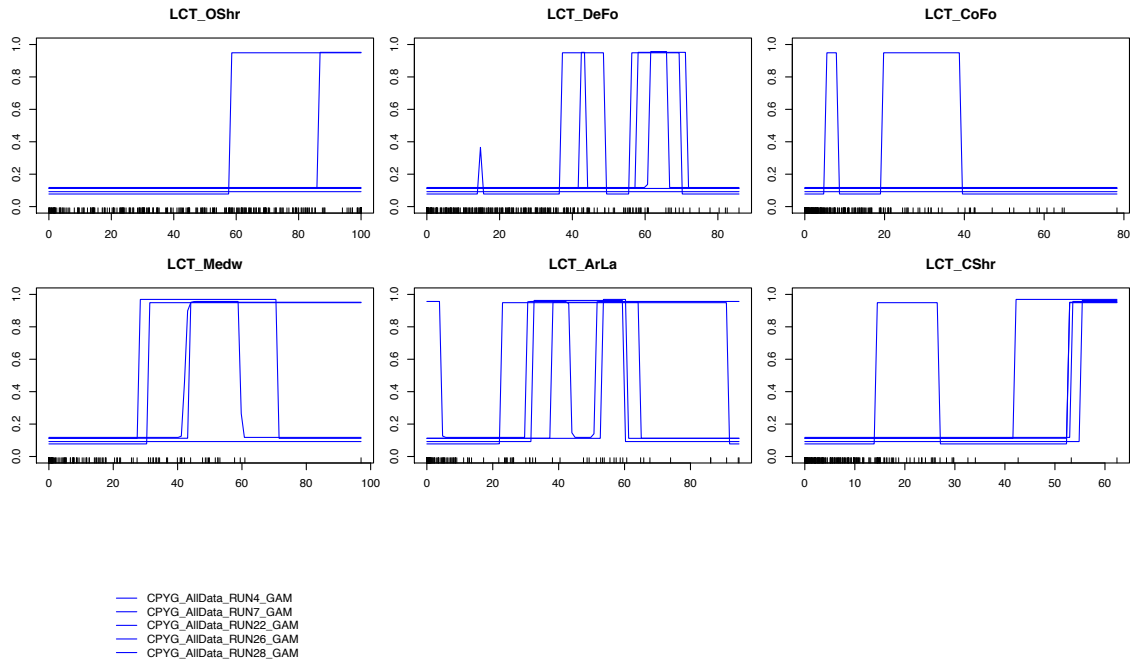
Response curves for CPYG's GLM



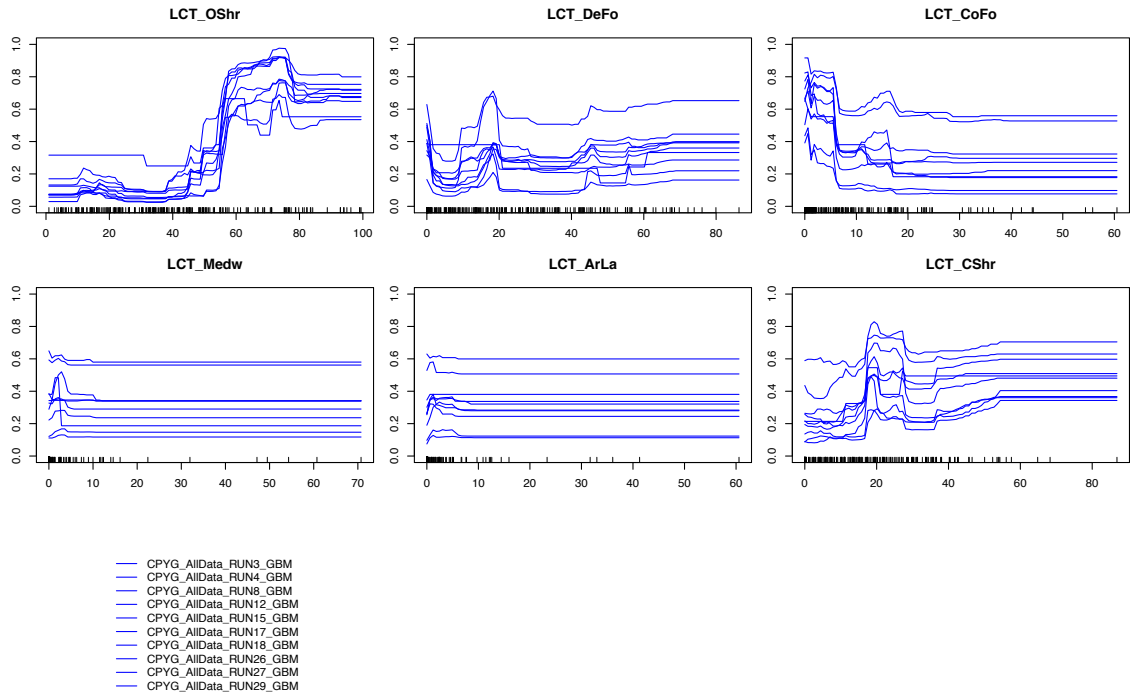
Response curves for CPYG's GAM



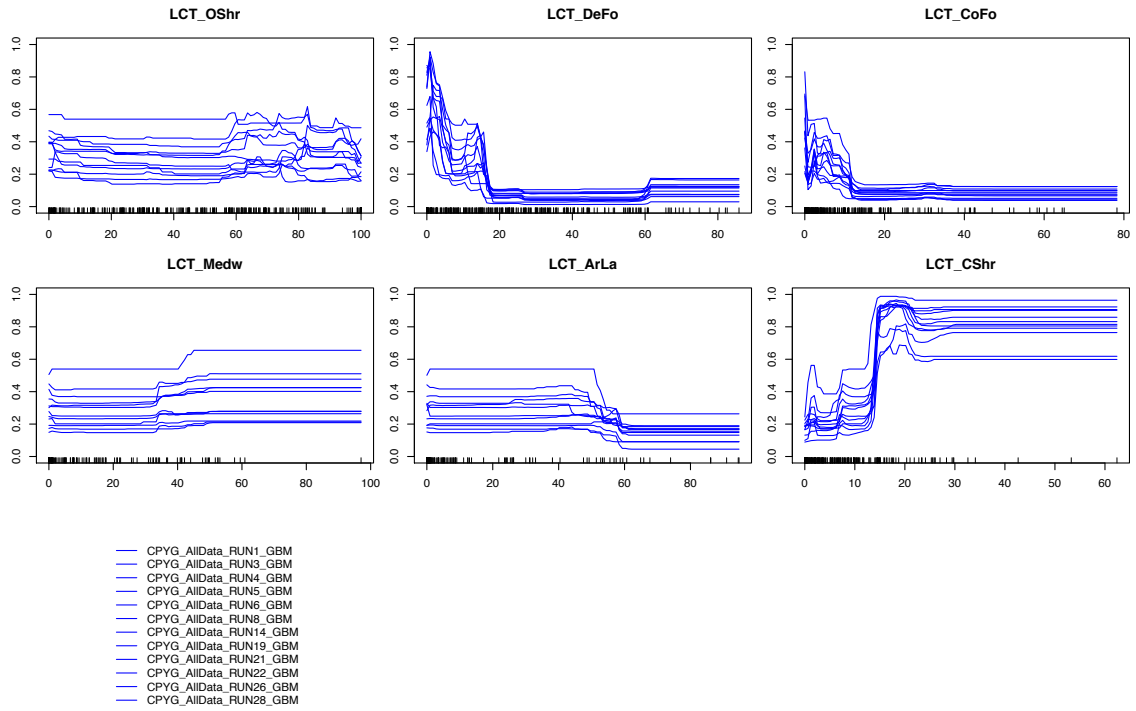
Response curves for CPYG's GAM



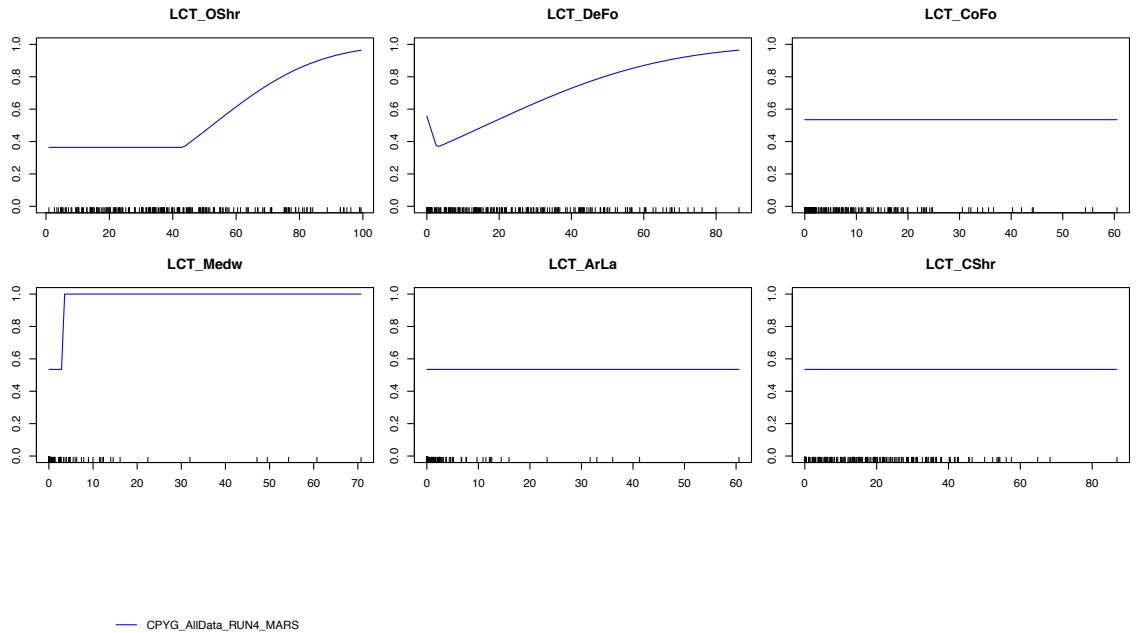
Response curves for CPYG's GBM



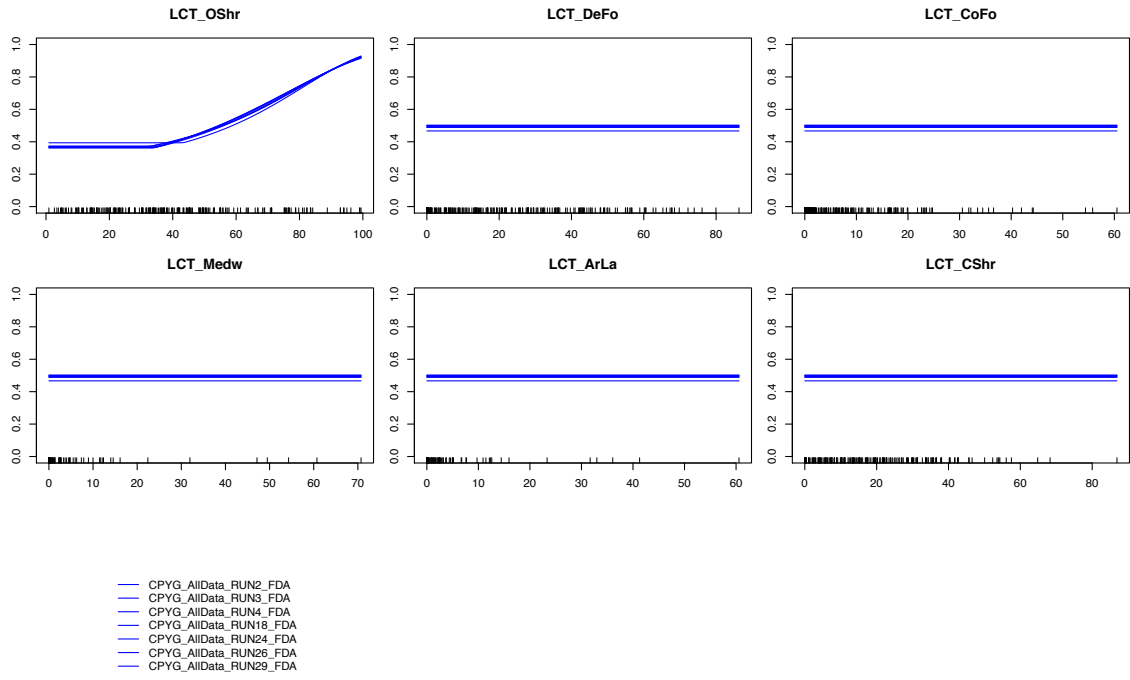
Response curves for CPYG's GBM



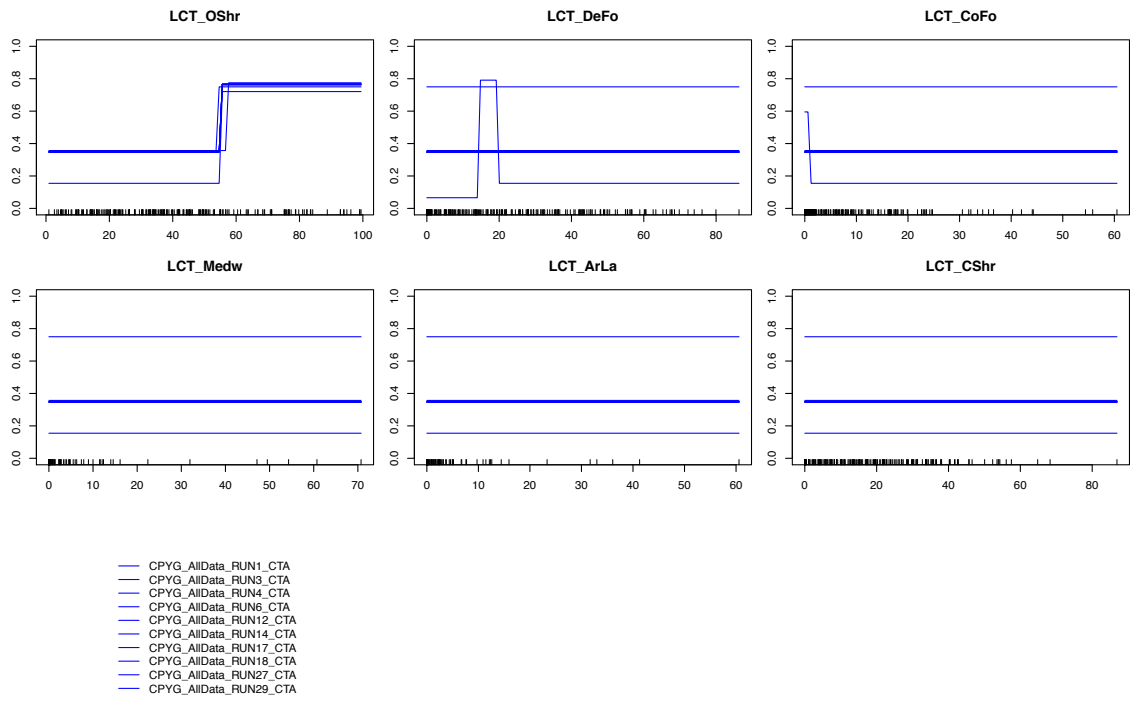
Response curves for CPYG's MARS



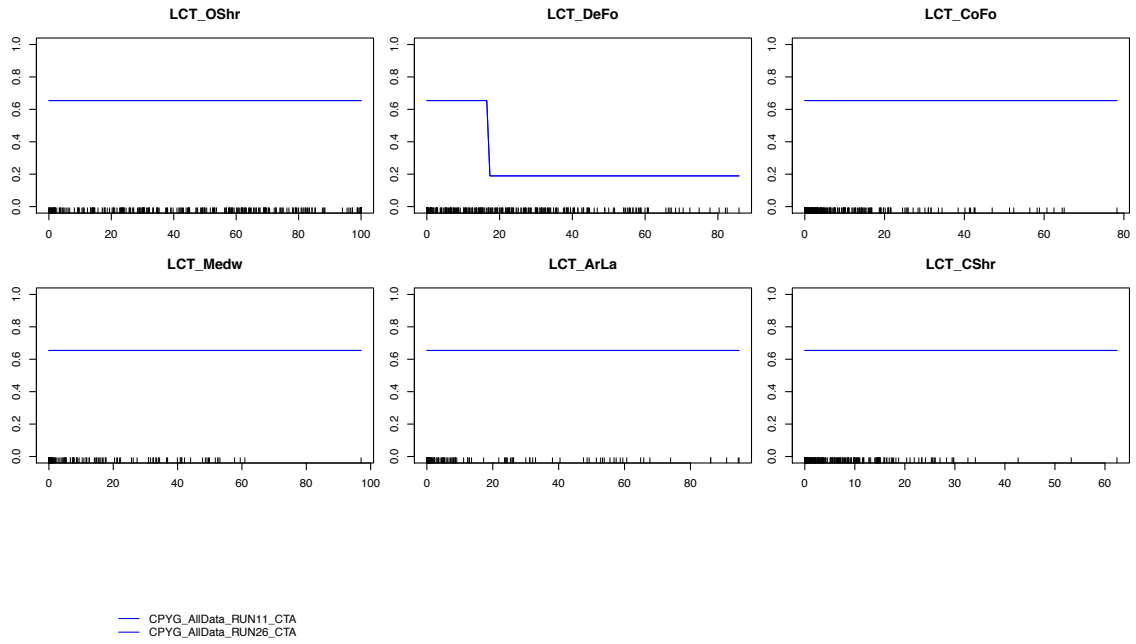
Response curves for CPYG's FDA



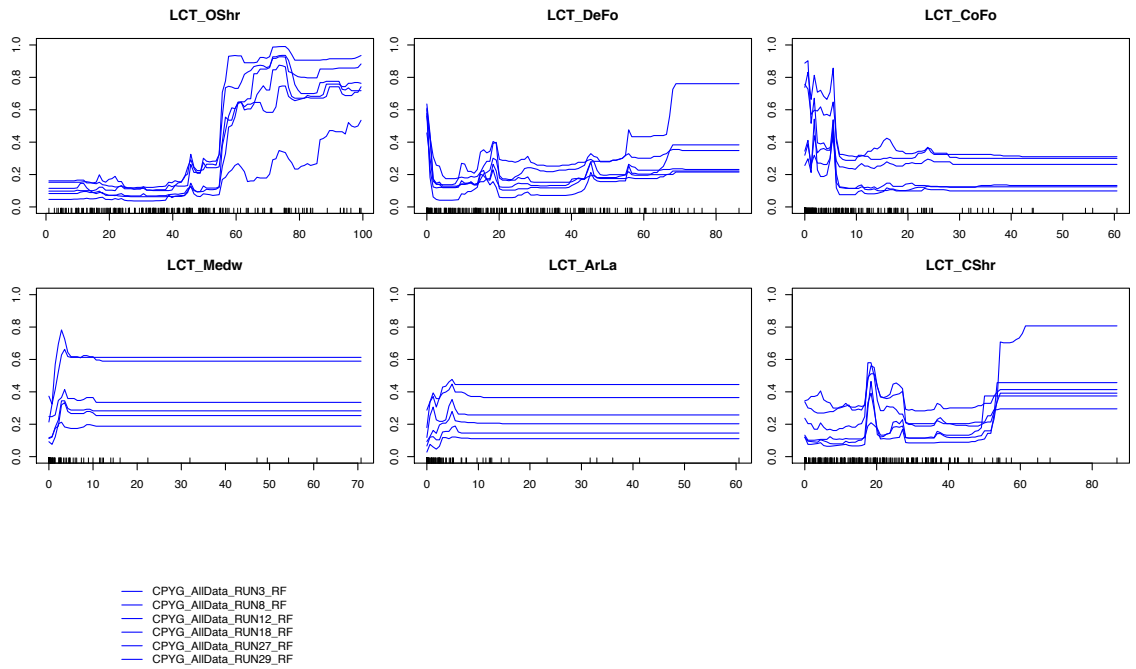
Response curves for CPYG's CTA



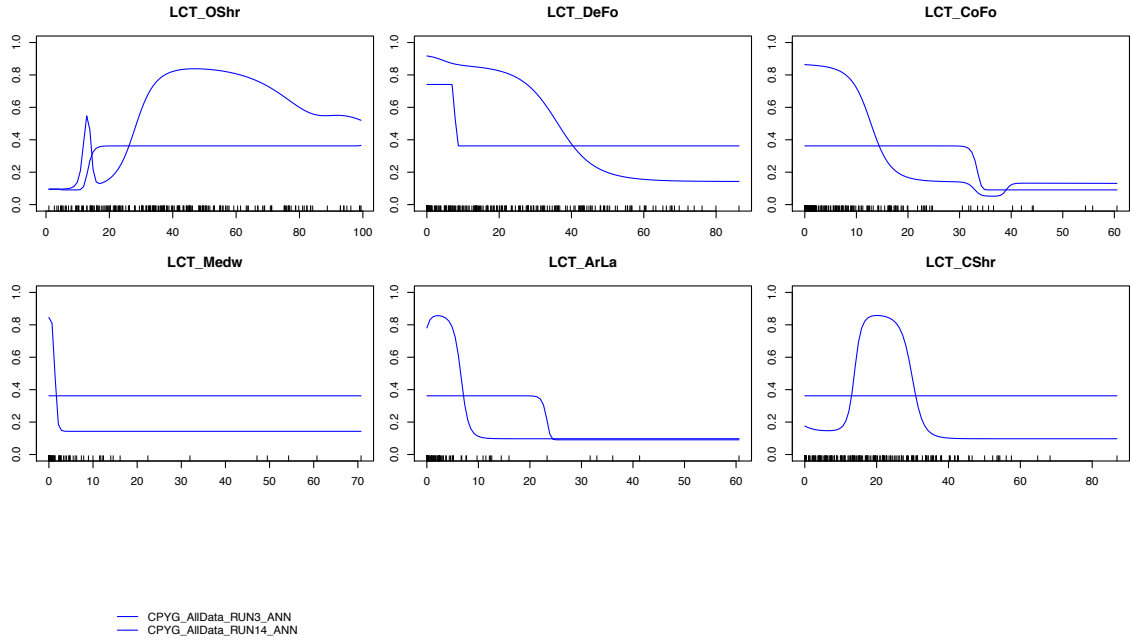
Response curves for CPYG's CTA



Response curves for CPYG's RF



Response curves for CPYG's ANN



Response curves for CPYG's ANN

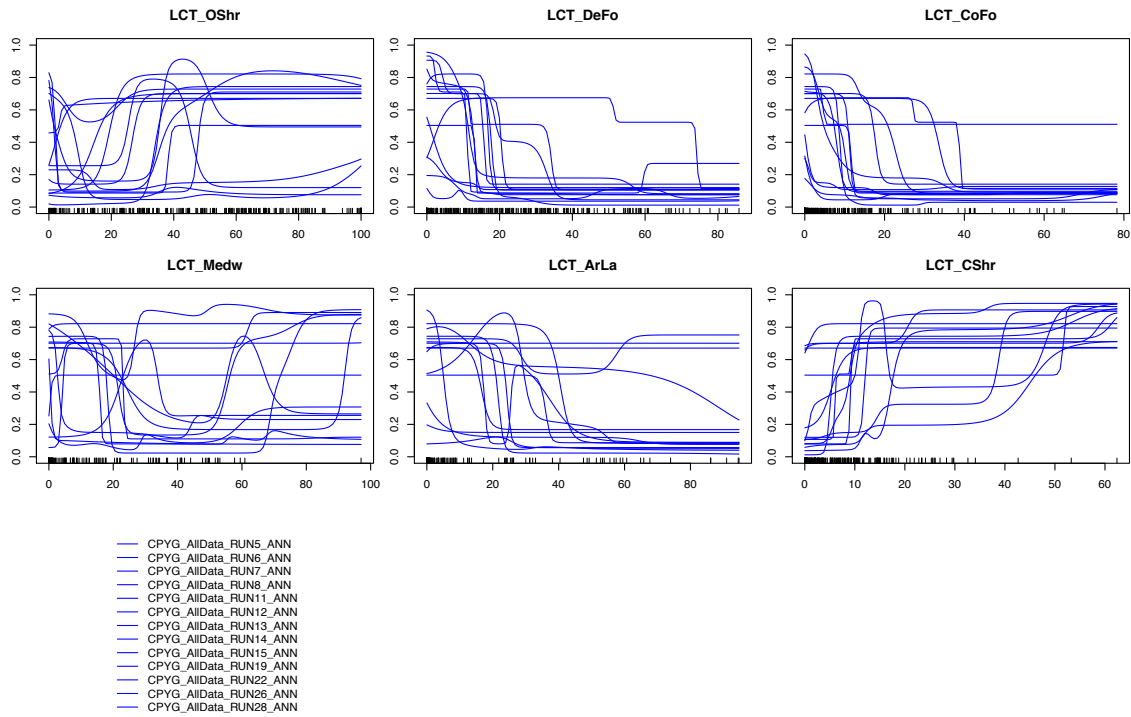
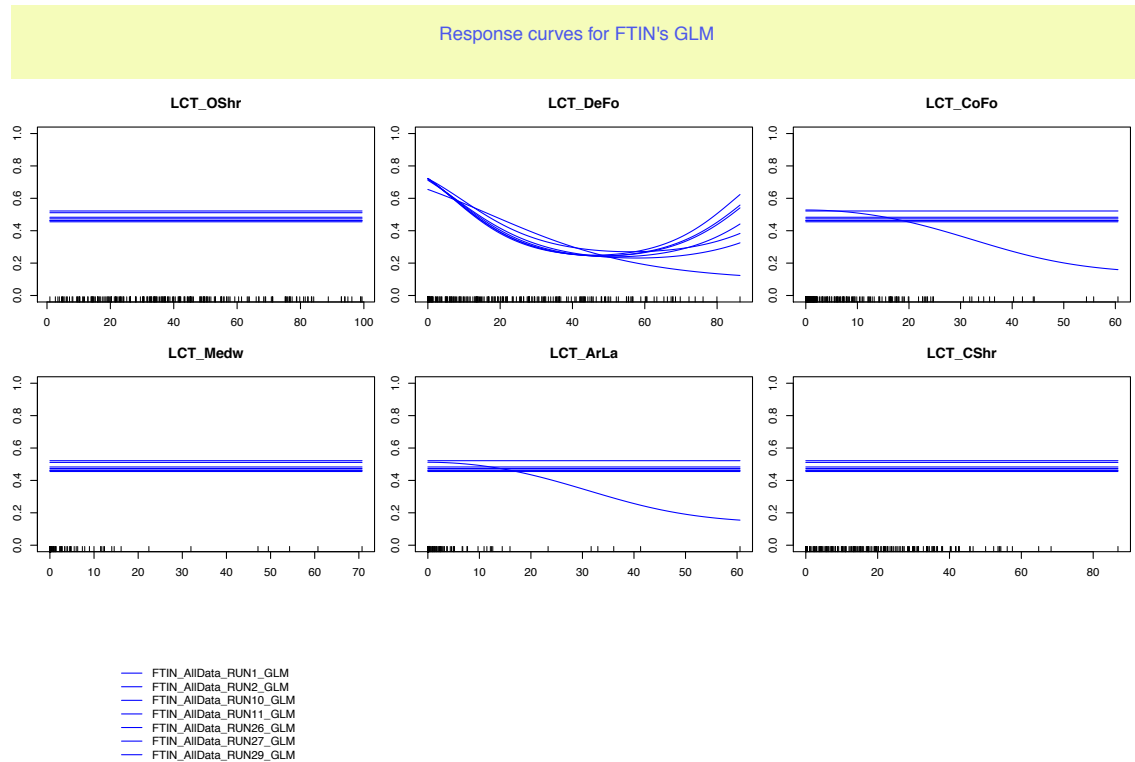
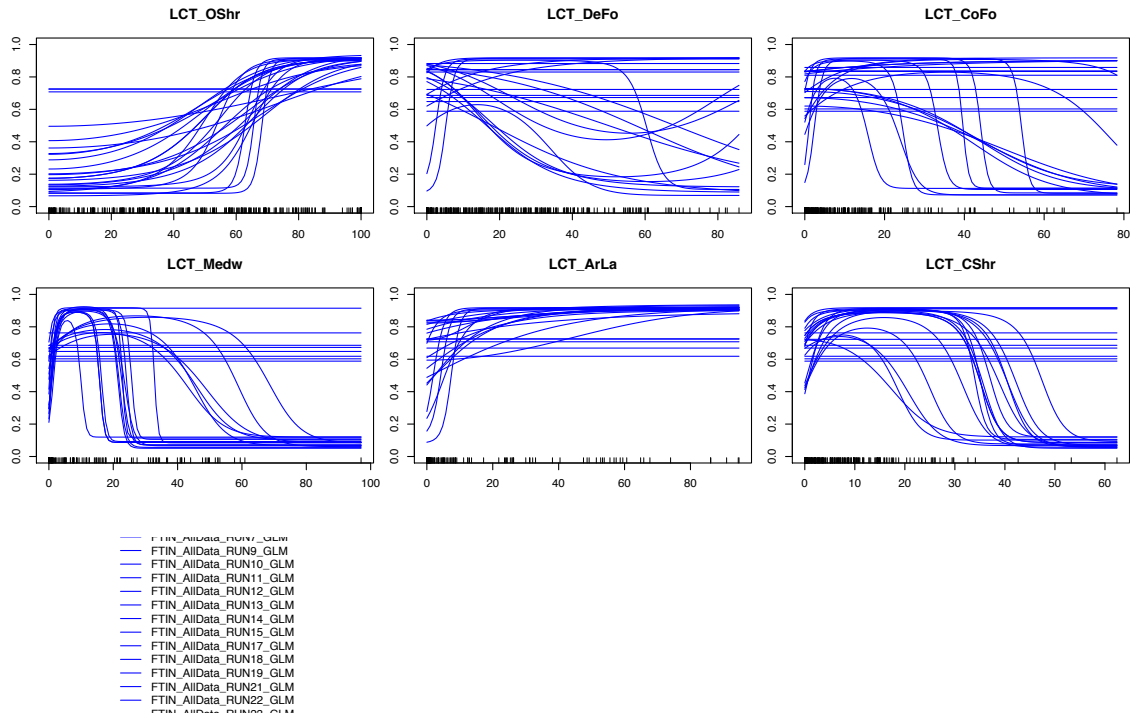


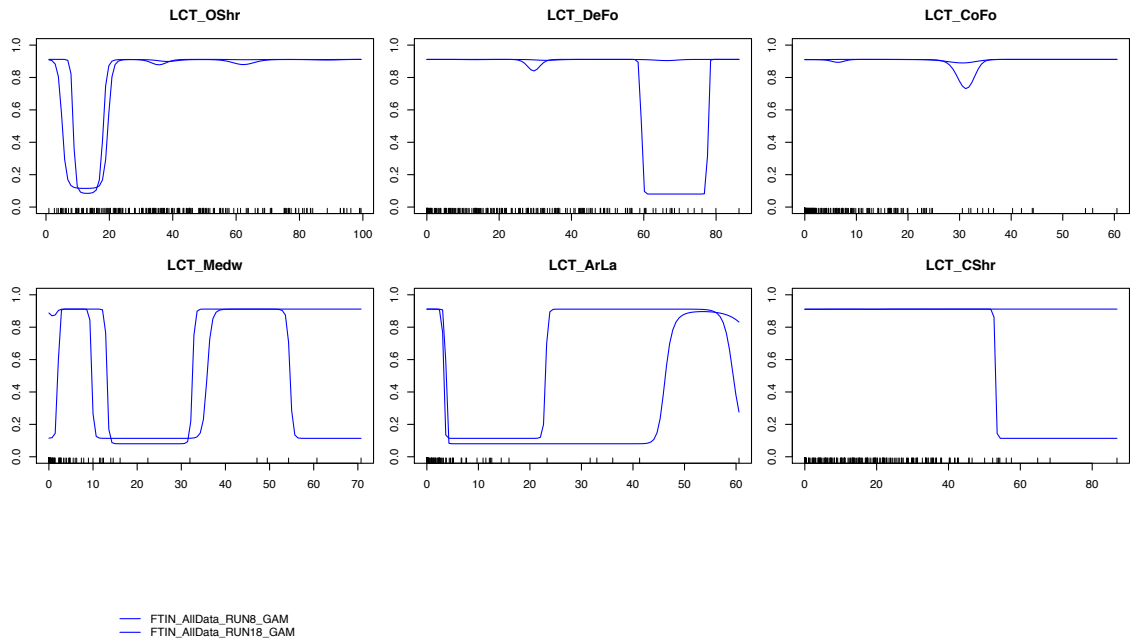
Fig. S2.2. Response curves for Common kestrel (*Falco tinnunculus*) for each modelling algorithm, at the scale of 500 meters, for 2001 and 2014 respectively. Acronyms: Open shrubland (LCT_OShr), Deciduous forest (LCT_DeFo), Coniferous forest (LCT_CoFor), Meadows and fallow land (LCT_Medw), Arable or farm land (LCT_ArLa), Closed shrubland (LCT_CShr); generalized linear models (GLM), generalized additive models (GAM), generalized boosted models (GBM; also known as Boosted Regression Trees, BRT), flexible discriminant analysis (FDA), classification tree analysis (CTA), multivariate adaptive regression splines (MARS), random forest (RF), and artificial neural networks (ANN). Only response curves for those models with AUC values higher than 0.7 are plotted. Response curves for SRE models are not supported yet by biomod2.



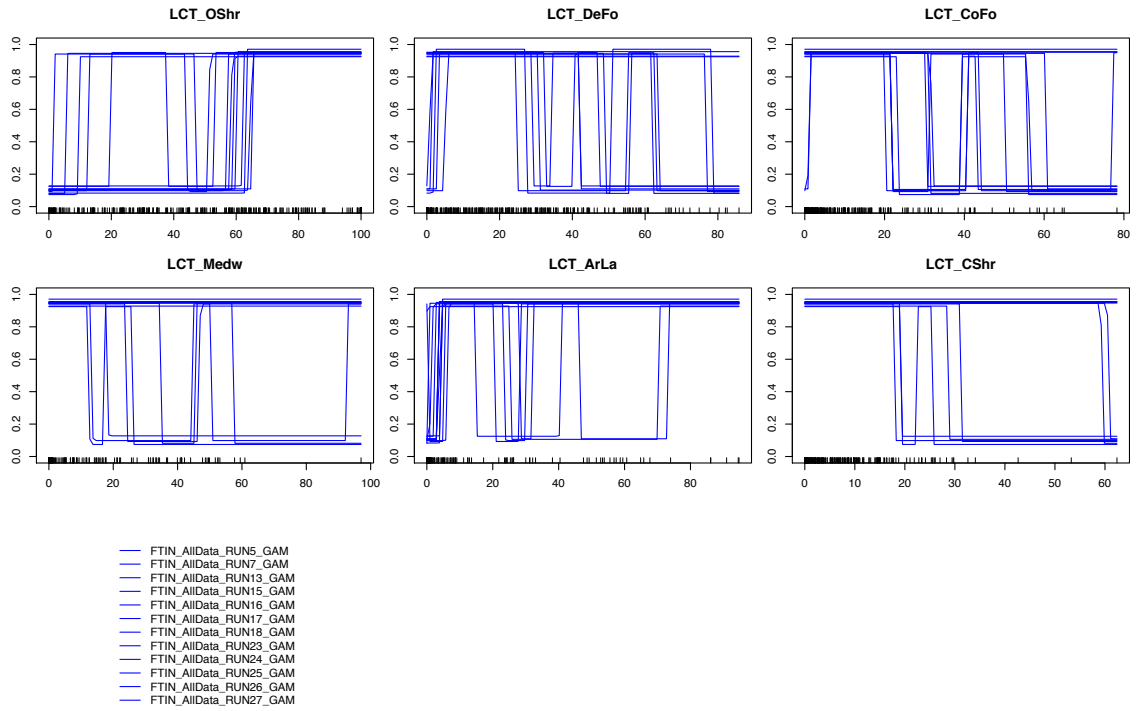
Response curves for FTIN's GLM



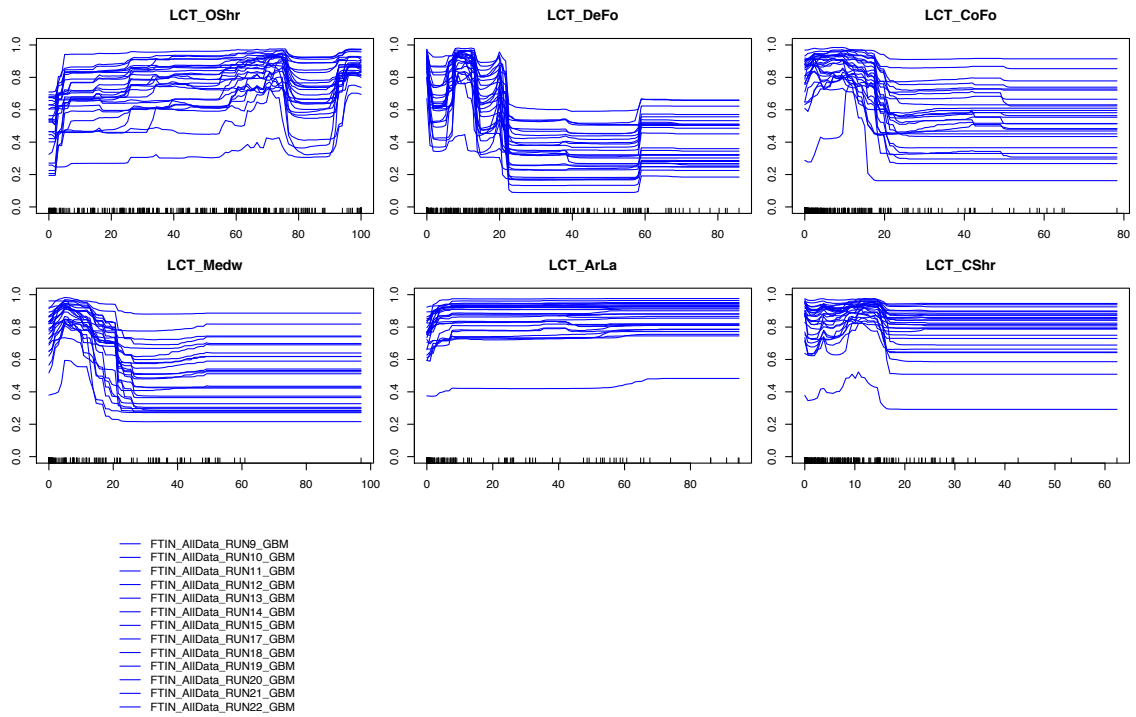
Response curves for FTIN's GAM



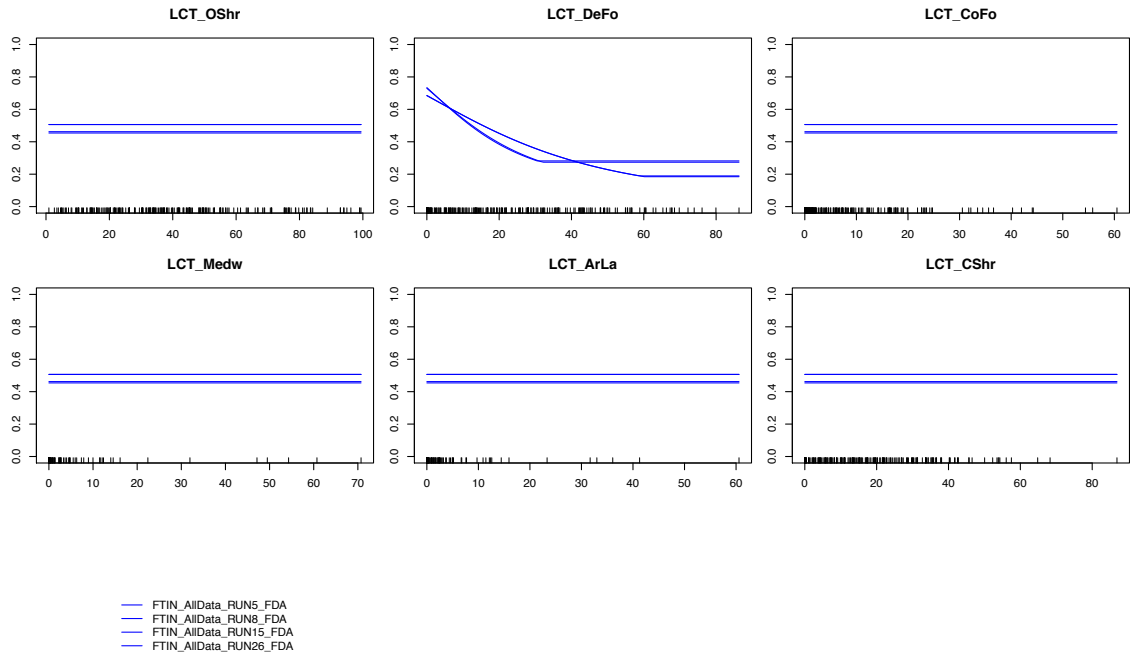
Response curves for FTIN's GAM



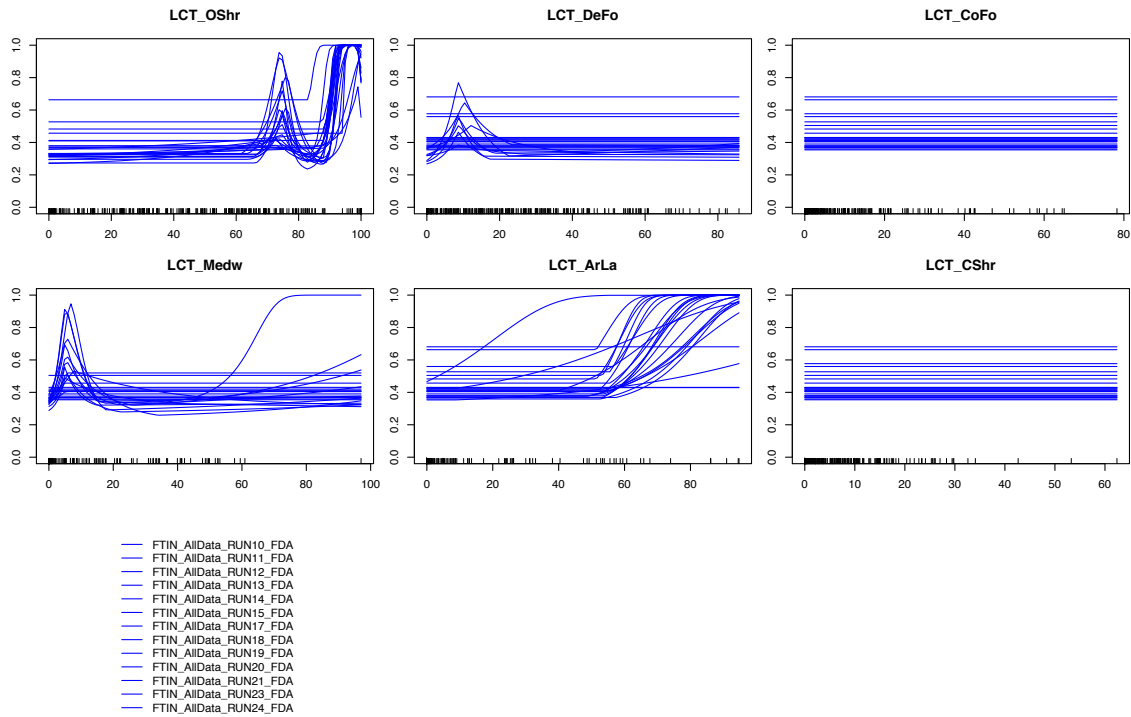
Response curves for FTIN's GBM



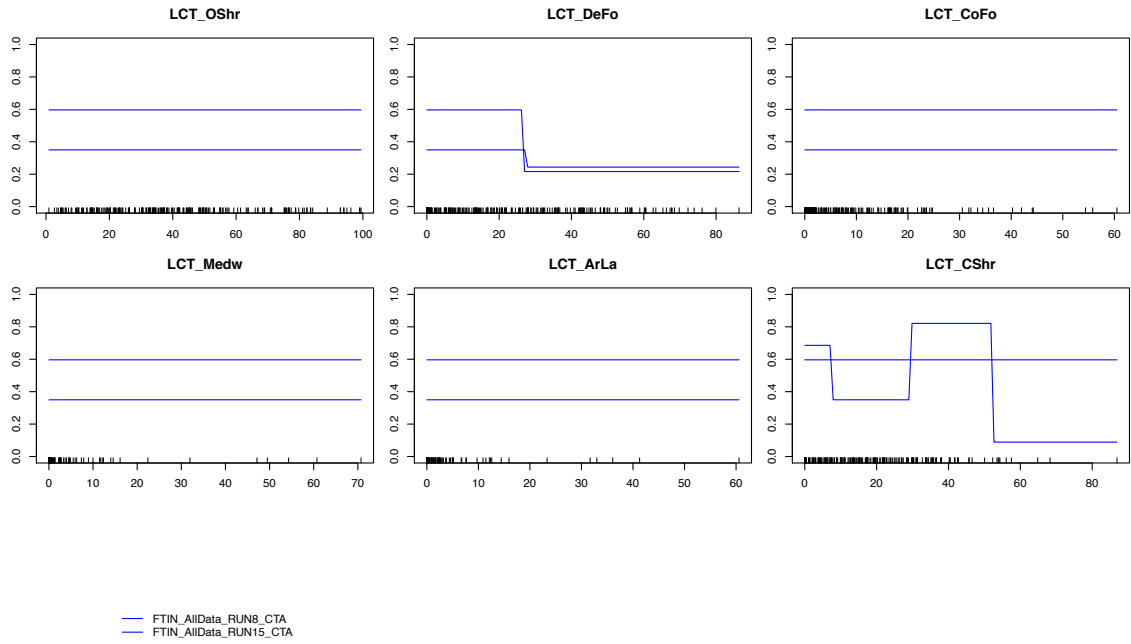
Response curves for FTIN's FDA



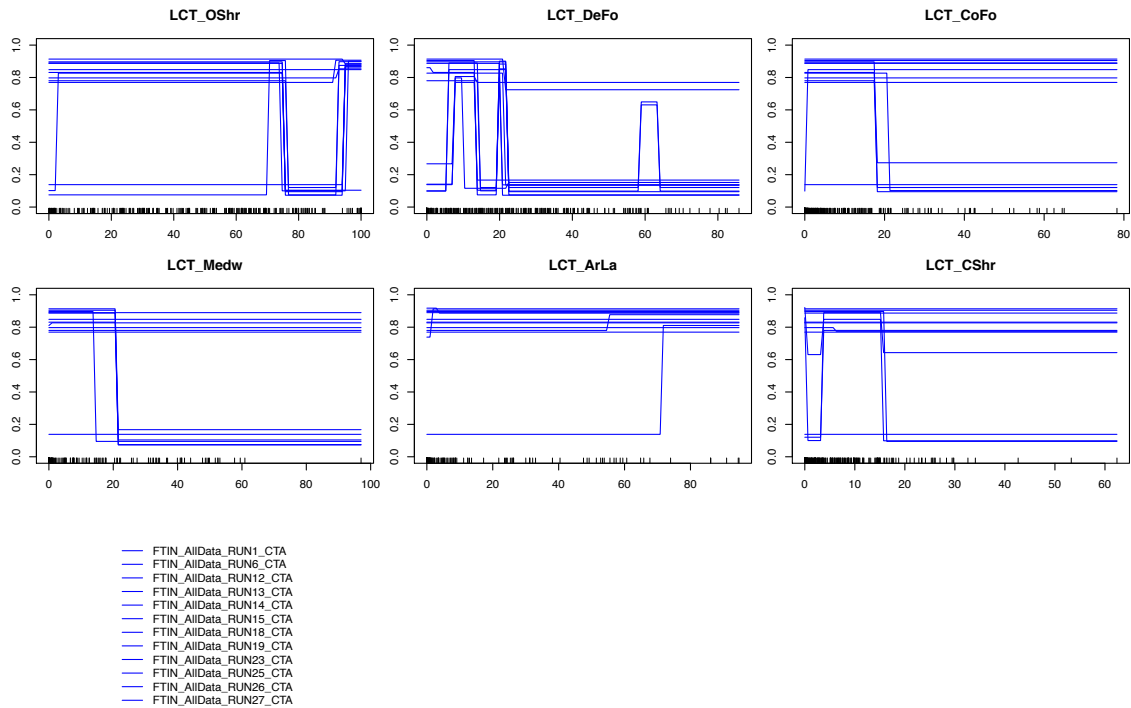
Response curves for FTIN's FDA



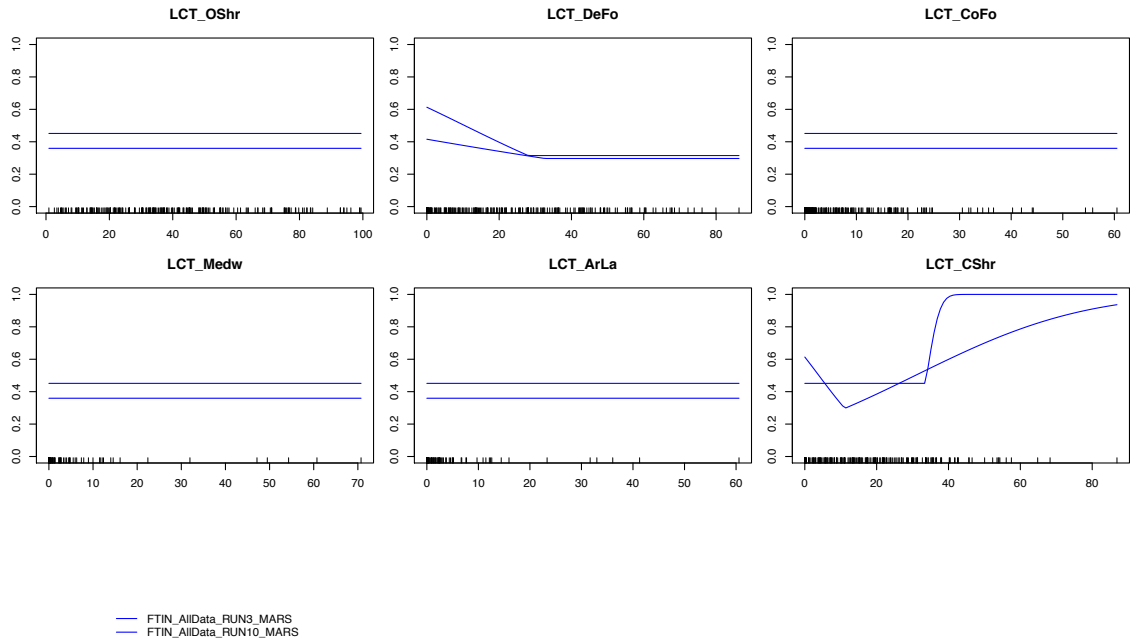
Response curves for FTIN's CTA



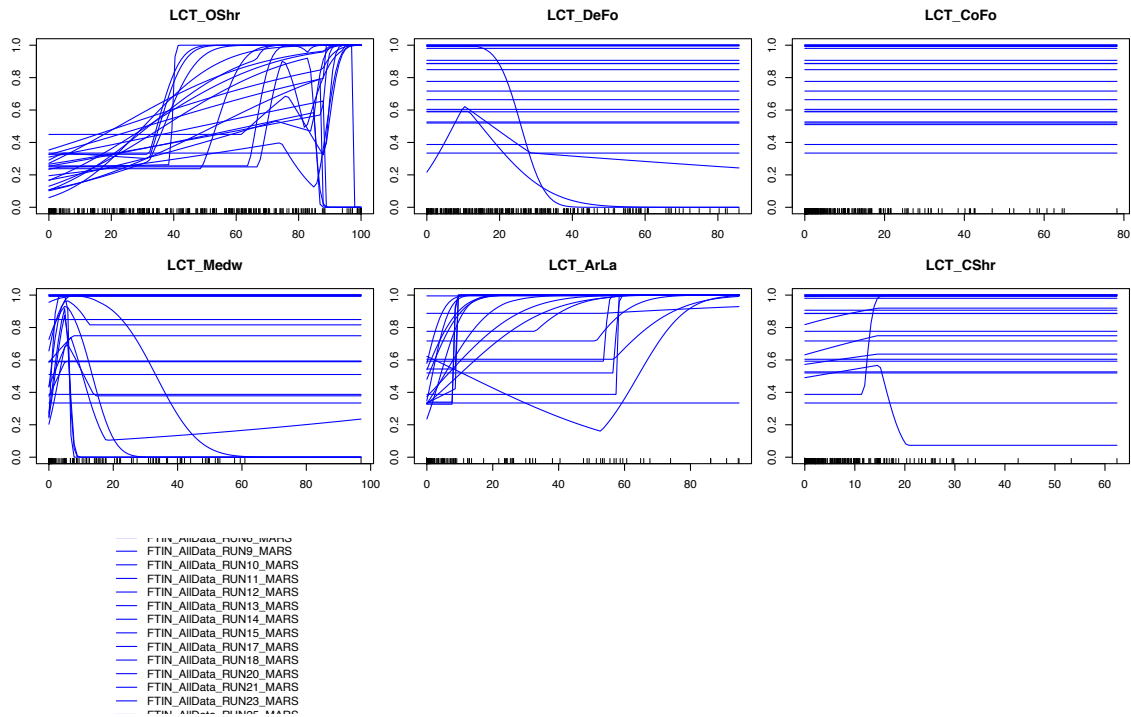
Response curves for FTIN's CTA



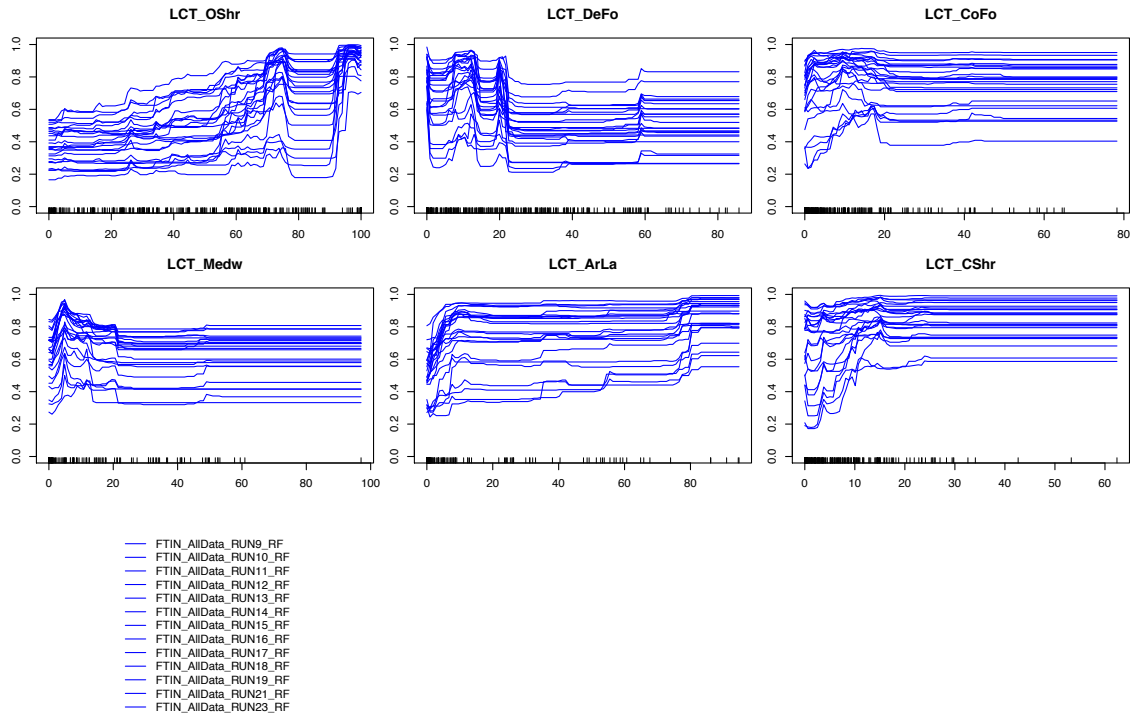
Response curves for FTIN's MARS



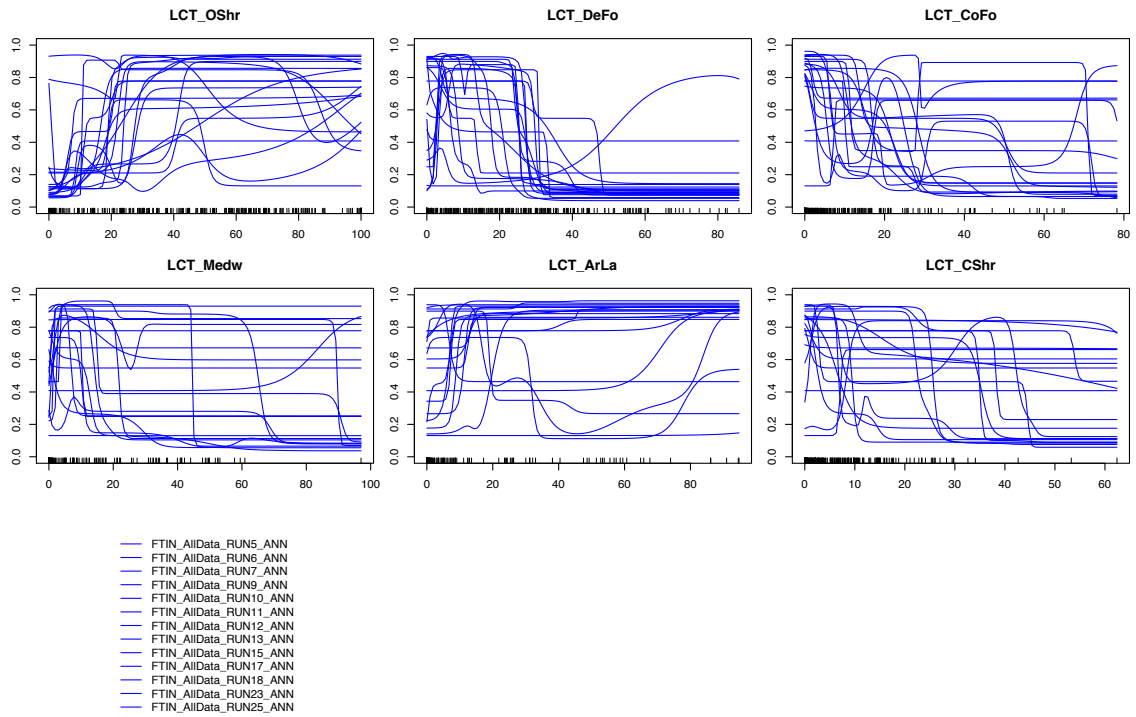
Response curves for FTIN's MARS



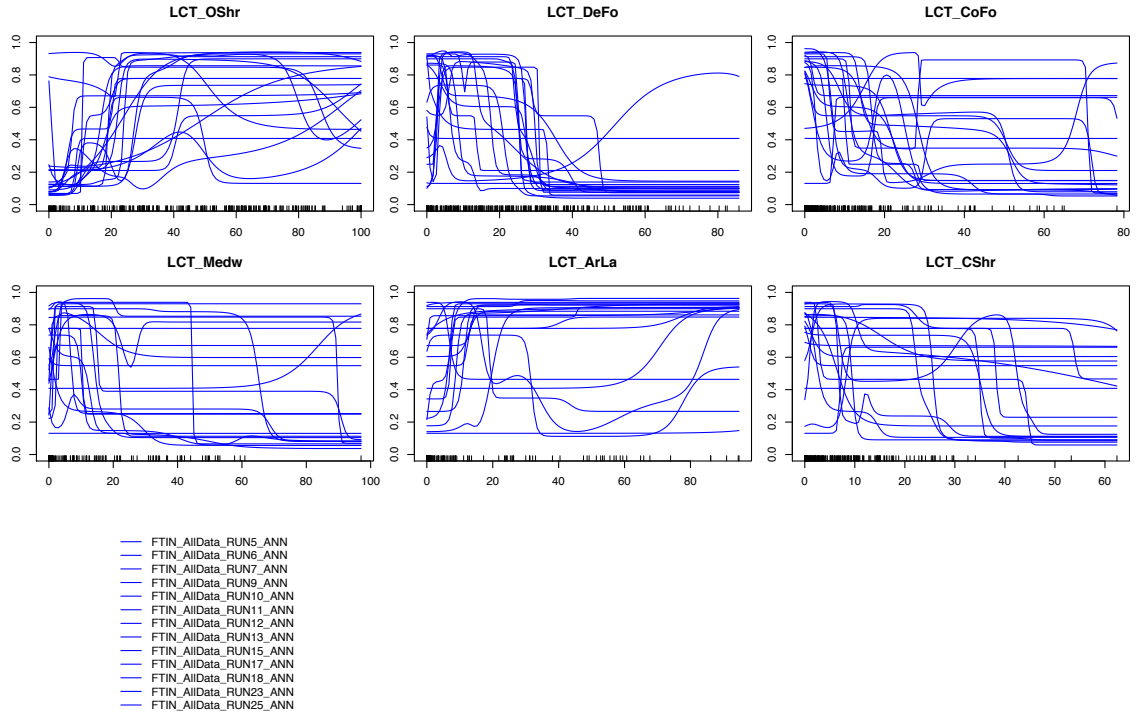
Response curves for FTIN's RF



Response curves for FTIN's ANN



Response curves for FTIN's ANN



ASSESSING THE TEMPORAL TRANSFERABILITY OF RAPTOR DISTRIBUTION MODELS: IMPLICATIONS FOR CONSERVATION

TAPIA L.¹, REGOS A.^{1,2,3}, GIL-CARRERA A.⁴ & DOMÍNGUEZ J.¹

Appendix S3. This appendix shows the correlation between each pair of predictors for years 2001 and 2014 to explore the potential effects of multicollinearity on model performance.

Correlation between land cover variables was moderate or low for almost all pairs of predictors, except for ‘Meadows and fallow land’ and ‘Arable or farm land’ for year 2001 (Pearson correlation coefficient $r > 0.7$, see Fig. S3.1).

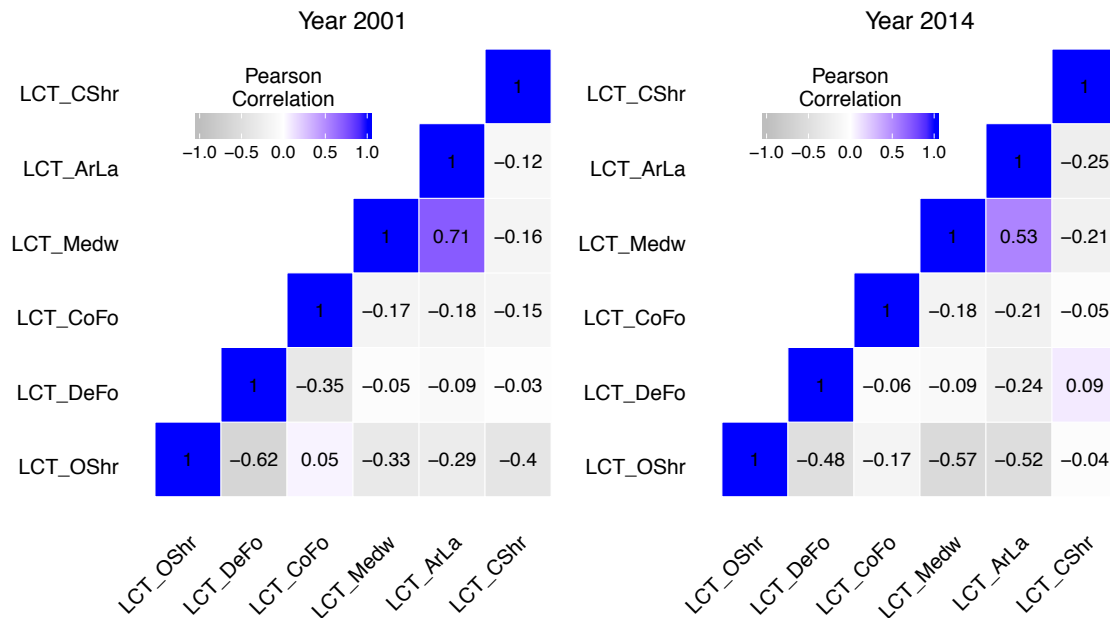


Fig S3. 1. Pearson correlation coefficient for year 2001 and 2014 at the scale of 500 meters. Acronyms: Open shrubland (LCT_OShr), Deciduous forest (LCT_DeFo), Coniferous forest (LCT_CoFor, Meadows and fallow land (LCT_Medw), Arable or farm land (LCT_ArLa), Closed shrubland (LCT_CShr).