**Thesis:** **Lack of overlap between breeding and migratory SDMs show the importance of season-specific management for migratory birds**

**Introduction**

* SDMs
* Migratory birds
* Seasons
* Spatial scales
* Call to action

**Methods**

*Study area*

* Site description
* PGC

*Breeding and migratory season data*

* Survey data
* GPS data 1
* GPS data 2

*Covariates at multiple spatial scales*

* Covariates
* Spatial scales of interest

*Species distribution modeling*

* Separate models for breeding and migratory models; data sources
* Choosing a modeling framework
* SDMTune modeling process
  + Removal of highly correlated variables: removing variables with high (>0.7 correlation), keeping the variable with the highest AUC.
  + Reduction of unimportant variables: removing variables which score below th = 2 using a jackknife AUC test.
  + Hyperparameter tuning: uses a Genetic Algorithm implementation (see the SDMTune or a prior paper from the same author), which functions similarly to a grid search but is substantially faster. The tuned hyperparameters include mtry, ntree, and nodesize.
* Normalization

*Analysis of covariate relationships*

* Covariate relationships

*Comparative distribution of seasonal habitat*

* Regional comparison
* Comparison of layers

*Shiny application*

* Basic description

**Results**

* Sample size

*Analysis of covariate relationships*

* Breeding
* Migratory

*Comparative distribution of seasonal habitat*

* Habitat distribution

**Discussion**

* ~~SDSS provide a solution to poor CST~~
* ~~By showing that habitat differs in~~
* Incorporating seasons and spatial scales allows for better conservation of migratory bird habitat
* Regional differences
* Spatial scales
* Urban habitat
* Flexibility in data sources
* ~~Non-avian taxa~~

**Supplementary information**

* SDSS derived metrics