

# **bbsBayes2 pre-workshop preparation**

**bbsBayes2 – An updated and improved R package for customized analyses of North American Breeding Bird Survey data**

**Tuesday, 8 August, 8:00–11:00 a.m. ET**

**Room H (Classroom)**

**Instructors:**

Adam C. Smith (Canadian Wildlife Service, Environment and Climate Change Canada)  
[adamsmith.birdstats@gmail.com](mailto:adamsmith.birdstats@gmail.com) Adam C. Smith on [conference Slack channel](#)

Brandon Edwards (Carleton University)

Steffi LaZerte ([steffilazerte.ca](http://steffilazerte.ca); Brandon University)

## **About the workshop**

[bbsBayes2](#) is a fully-rebuilt R package (replacing `bbsBayes`), for fitting the hierarchical Bayesian models used to estimate status and trends from the North American Breeding Bird Survey. This new package provides improved parameter estimation using Stan, spatially explicit models well suited to exploring spatial patterns in trends, a streamlined workflow, the ability to use custom stratifications, and advanced functions to assist with cross-validation and model comparisons.

During this workshop you will follow along with live coding to get a hands-on experience manipulating and visualizing output from a range of models and species. We will demonstrate the package's functions, including those that allow you to:

1. Prepare the data for modeling a given species
2. Estimate trends for any time period (1970-2019, 2005-2015, 1980-2000, etc.) and plot population trajectories

3. Generate heat maps of population trends
4. Choose from a suite of built-in hierarchical Bayesian models and access tools to help with cross-validation and model comparison
5. Estimate trends for customized regions (e.g., all of the eastern Boreal, Great Plains versus eastern populations of grassland birds)
6. Access and customize the main Stan models to change priors or add covariates (e.g., annual climate metrics or landcover).

## To do before the workshop

To make our time on Tuesday as efficient as possible, please ensure that you have completed to following steps prior to the workshop.

### 1. Install software and download BBS data

Run the installation steps at the beginning of the [Getting Started Vignette](#) including:

1. Install the latest release of bbsBayes2 (please update if you have already installed it)
2. Install cmdstanr and confirm that your setup is correct.
3. Download the BBS data.

Contact [Adam](#) if you run into problems with these installations

### 2. Download fitted model files

In addition, please download these zip files (from a Google Drive, links below) that include stored model output and an alternate stratification map that we'll use during the workshop. These additional files will allow us to try out the summary functions (trends, trajectories, trend maps, etc.), without having to run the models yourself (BBS models can require hours or even days to finish sampling). Once downloaded, unzip them to a directory called *output* within the working directory where you expect to do your coding during the workshop.

[Fitted models for Scissor-tailed Flycatcher](#)

[Fitted model for Barn Swallow using First Difference spatial model](#)

[Fitted model for Barn Swallow using GAMYE spatial model](#)

[Alternate Stratification](#)

## Workshop plan

We will start by demonstrating some of the [basic workflow](#) for using the package, largely using examples from the package vignettes.

We will cover the topics in the list above. We will also be sure to leave time to answer questions and to try to demonstrate some of the more advanced aspects of the models and package. We'll be flexible and focus our time on aspects/issues/questions that are of interest to the group.

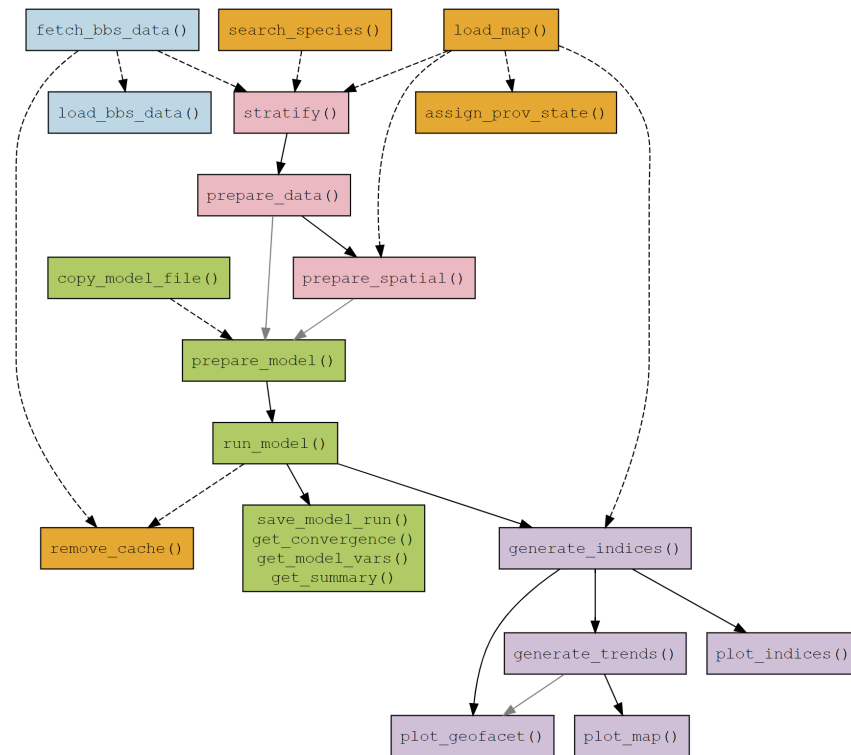


Figure 1: Relationships among functions in the bbsBayes2 package

## If you are new to R

The content of this workshop assumes that everyone is familiar with working R. So if you are new to R, you can expect a rather steep learning curve. But if you're game, then we are too. Before you run the package installation steps above. Install both R and RStudio, following the friendly directions [here](#).