A Tutorial to Atlas Visualization

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1 Introduction

Welcome to *A Tutorial to Atlas Visualization*, where we aim to guide you through the seamless process of acquiring and visualizing pre-generated bird atlases. This tutorial is designed explicitly for conservationists, researchers, and enthusiasts who wish to explore bird distribution patterns across different geographic areas and time intervals. Our journey begins with the SaveBirds GitHub Organization, a repository rich with meticulously prepared atlases that serve as a cornerstone for conservation and research efforts.

The objective of this tutorial is twofold. First, we will navigate the process of downloading the desired atlases directly from the SaveBirds GitHub Organization, ensuring you have the tools necessary for advanced geographic analysis. Second, we delve into ArcGIS's visualization process, transforming raw atlas data into insightful, high-quality rasters. Whether you are a seasoned GIS professional or a novice in data visualization, this tutorial promises to equip you with the knowledge and skills to bring the world of avian species to your fingertips, fostering a deeper understanding of bird habitats and distributions for conservation and mapping endeavors.

2 Prerequisites

Before engaging with a bird atlas, the system must be prepared with the requisite software. The fundamental requirement encompasses the installation of ArcGIS Pro, necessitating version 2.5 or higher. ArcGIS Pro may be procured from the official website, accessible via this link to download ArcGIS Pro. The acquisition and installation of the most current version are advocated to maximize the utility of the software's extensive capabilities.

3 SaveBirds.app GitHub Organization

The SaveBirds.app GitHub Organization (Figure 1) hosts a collection of repositories, each containing bird atlases. These repositories are organized by geographical areas and year intervals. Currently, there are 15 repositories, including *Bird_Atlas_BCR_BBS_data_2018_2022*. This repository holds bird atlas data for Bird Conservation Regions (BCR) based on Breeding Bird Survey (BBS) data from 2018 to 2022 for all bird species. The repository's naming system is organized into four distinct segments, ensuring a clear and systematic structure for efficient navigation and understanding:

Bird_Atlas_[Geographic Area]_[Data Source]_[Year Interval]

For example:

Bird_Atlas_BCR_BBS_data_2018_2022

We designed this format to convey essential information about the atlas's content concisely. To explain further:

1. **Bird_Atlas**: An atlas about birds, but it could be anything.

2. **Geographic area**: Extracted from the shapefile name.
3. **Data Source**: BBS data curated by SaveBirds.app.
4. **Year interval**: Based on the BBS data extracted from the SaveBirds.app.

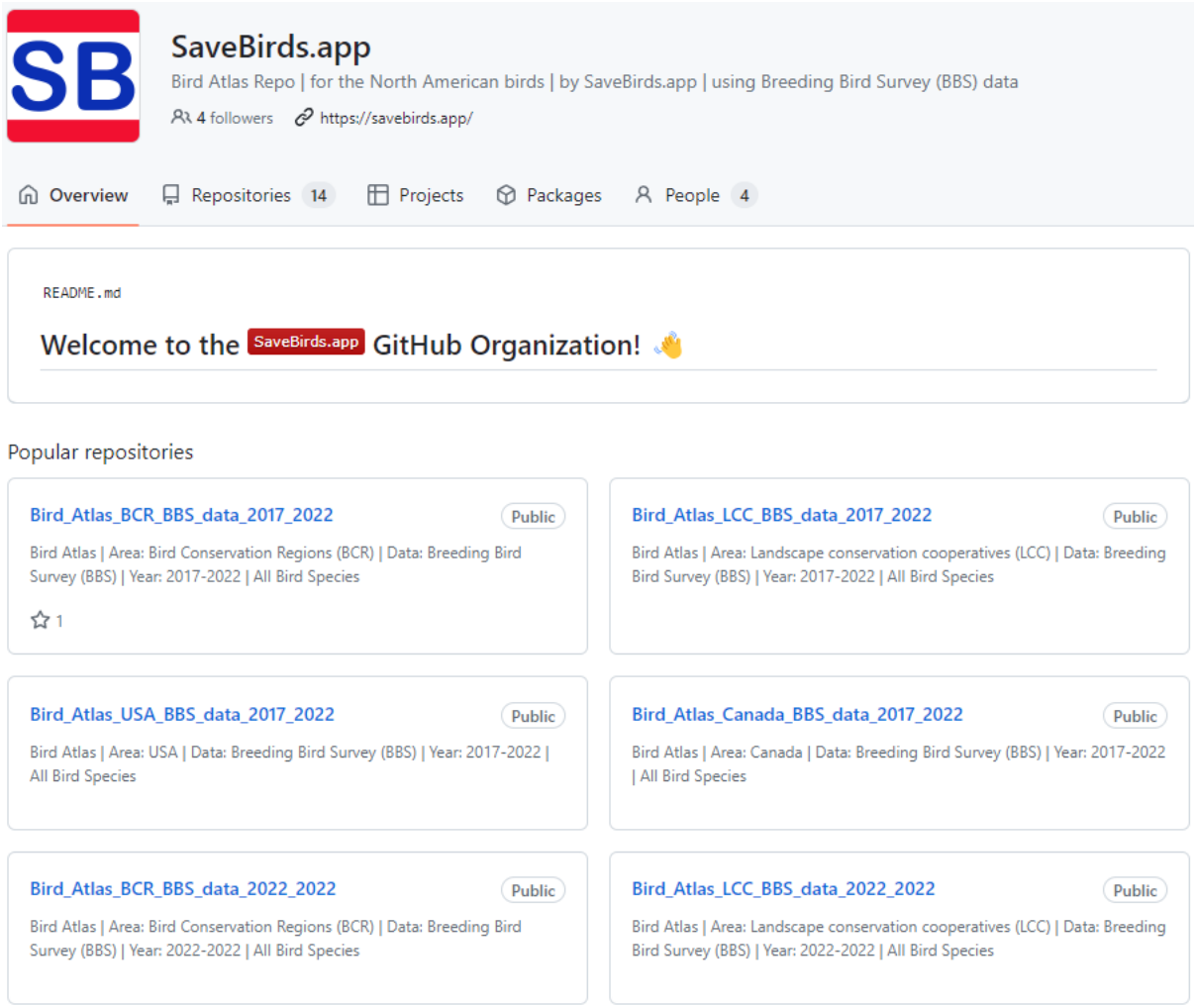

Figure 1: The home page of the SaveBirds.app GitHub Organization

4 Repositories

Users can access a comprehensive inventory of atlas repositories in the repository tab (Figure 2). Individuals can condense or expand the displayed list within this interface for enhanced navigability. Furthermore, the platform provides a sorting feature, enabling users to filter the repository list by name or the last modification date. This sorting functionality is complemented by the ability to adjust the sequence in which repositories are displayed, allowing for ascending and descending orders. Additionally, the system offers a filtering capability, permitting users to refine the list based on criteria such as star status. This array of features collectively facilitates a user-friendly experience in managing and accessing atlas repositories.

5 Download an Atlas

To download a pre-generated atlas, navigate to the preferred repository, select the *Code* button, and opt for *Download Zip* to initiate the download effortlessly (Figure 3).

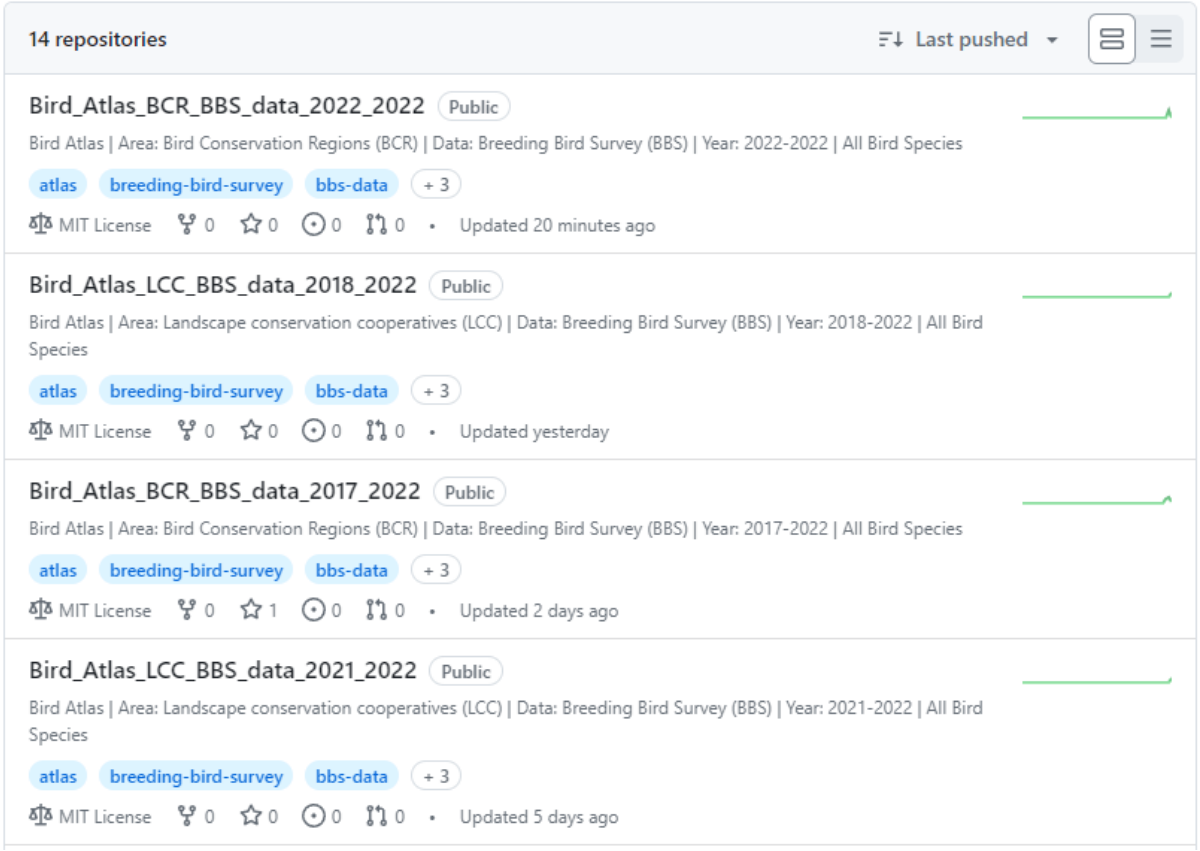

Figure 2: The Repositories of the SaveBirds.app GitHub Organization

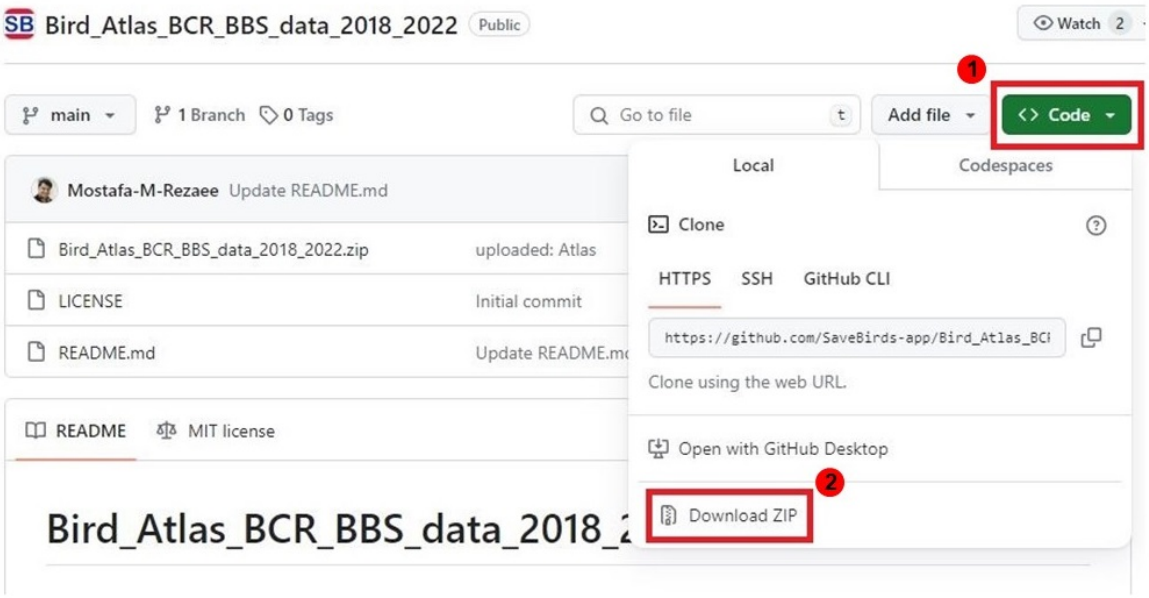

Figure 3: To download an atlas

6 Import the atlas into ArcGIS Pro

Launch the ArcGIS Pro and import the downloaded atlas into ArcGIS Pro. Recall the pre-generated atlas by selecting the *Map tab* and opting for the *Add Data* option. Then, Navigate to the folder housing the pre-generated atlas. The *.gdb* databases contain the rasters that are ready to be visualized (Figure 4). Choose and open your desired *.gdb database*. Allow a brief moment for ArcGIS to retrieve and integrate the raster. (Figure 5).

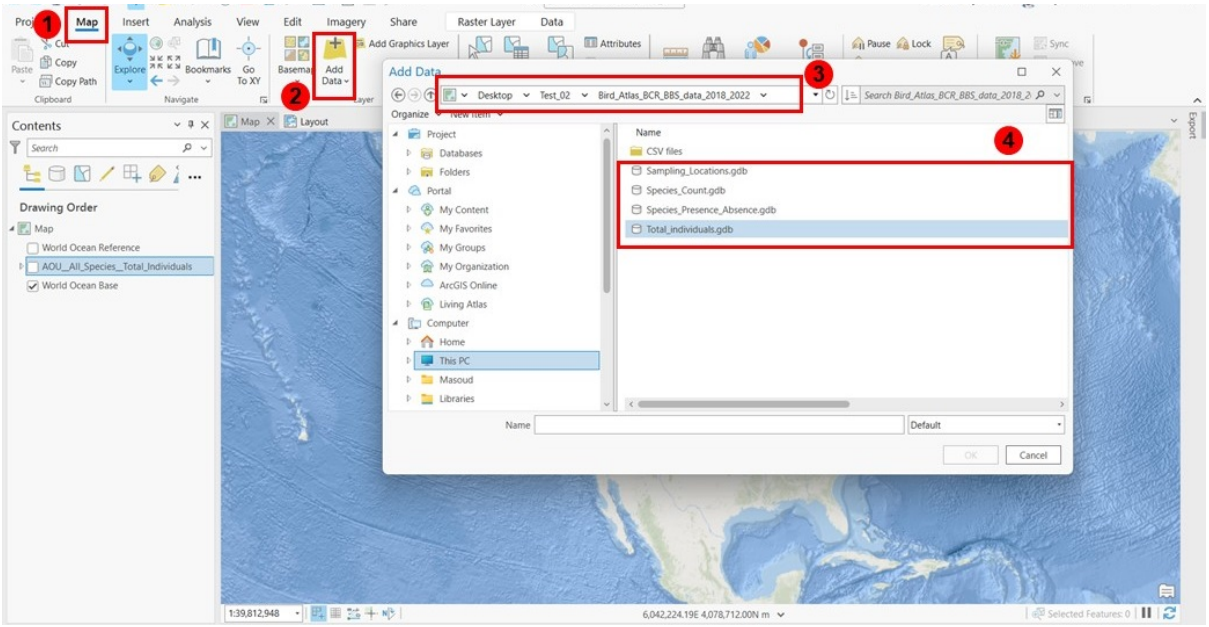

Figure 4: To import the atlas into ArcGIS Pro

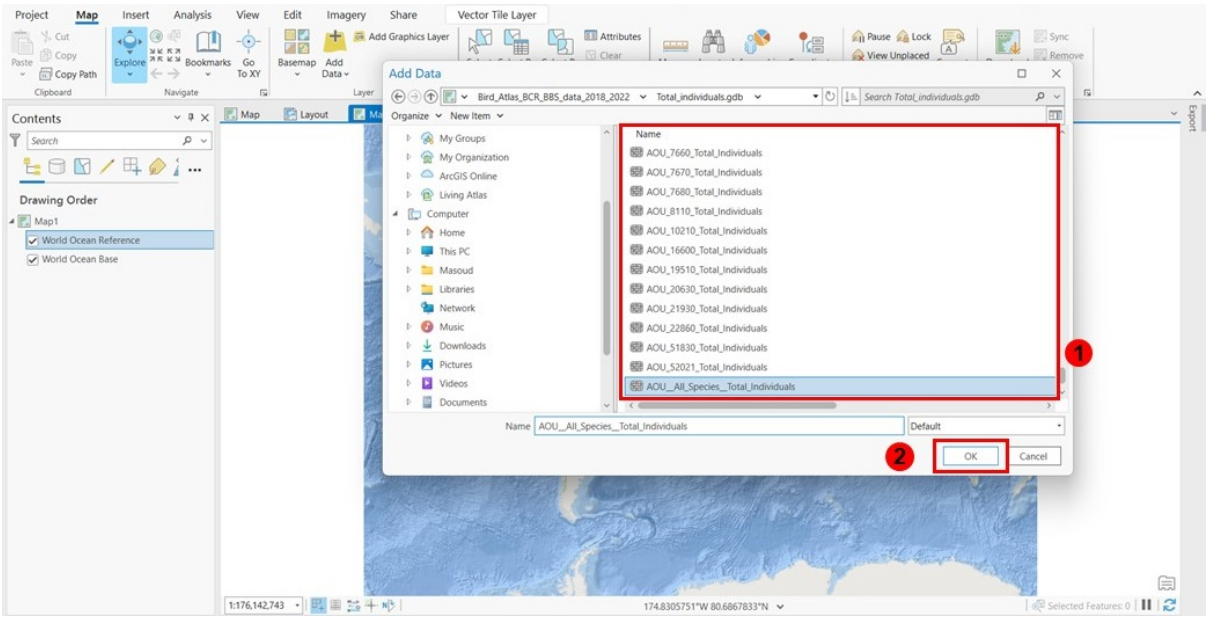

Figure 5: To Load Raster Data from the pre-generated atlas

7 Refine the Raster

To remove the areas where no birds were seen, right-click on the created layer (Figure 6), then opt for *Symbology* to access the customization options (Figure 7).

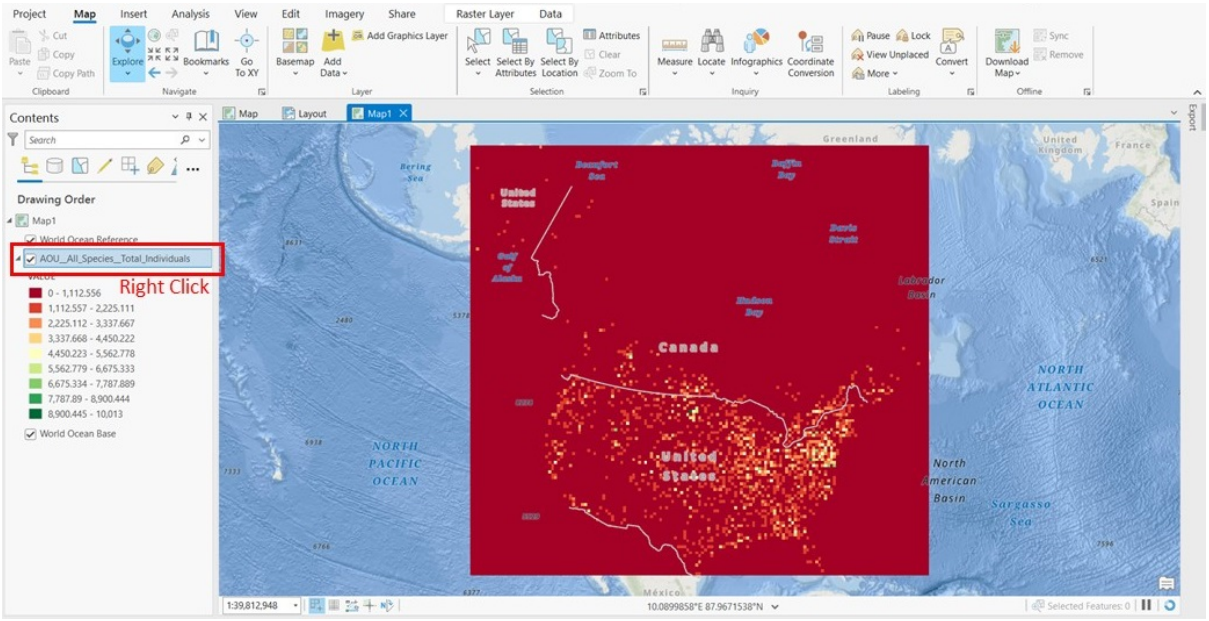

Figure 6: To Refine the Raster (step 1)

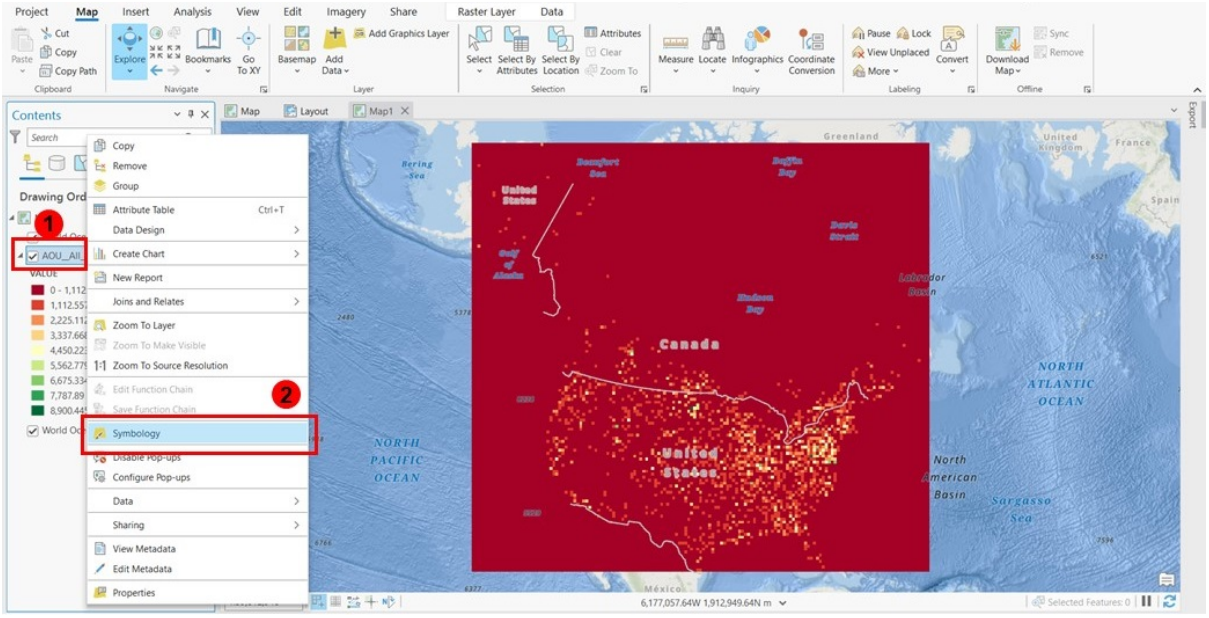

Figure 7: To Refine the Raster (step 2)

8 Customize Data Representation

Within the *Primary Symbology* section, select your preferred method for data classification, tailoring the representation to suit your analytical needs best (Figure 8).

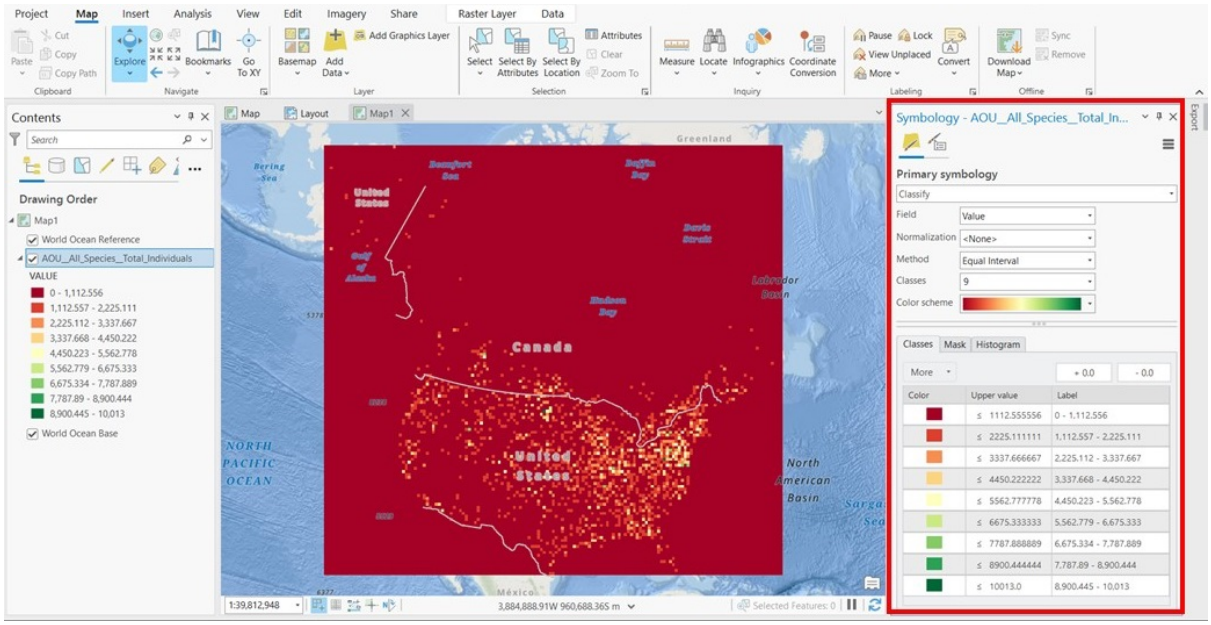

Figure 8: To Select Data Classification Method

In the *Field* section, opt for the *Value* option to articulate the number of species observed in each cell. Customize the number of classes and choose a color ramp to align with your preferences, enhancing the visual representation of your data (Figure 9).

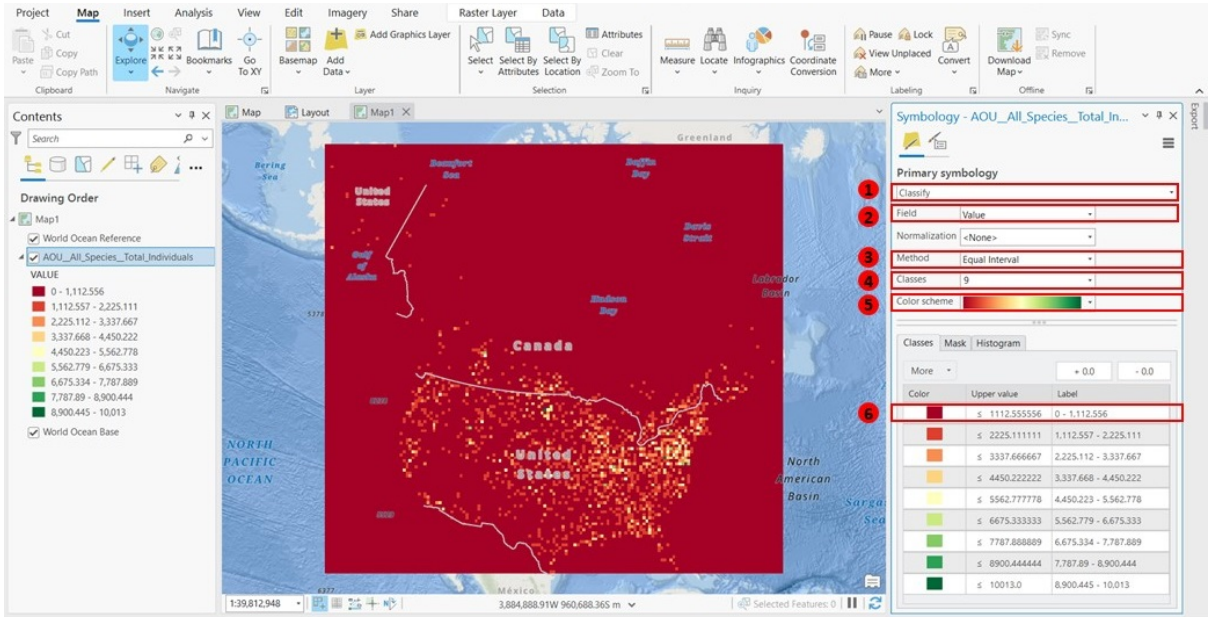

Figure 9: To Customize Data Representation

Ensure points without species sightings are visually invisible by adjusting the *Upper value* of the initial color row to zero while maintaining its *Label* at 0.001-0. Subsequently, click on the colored square within that row and select *No Color* to integrate a transprant representation for those specific points. (Figure 10).

It is imperative to highlight that the data visualization method can be altered from the *Method*

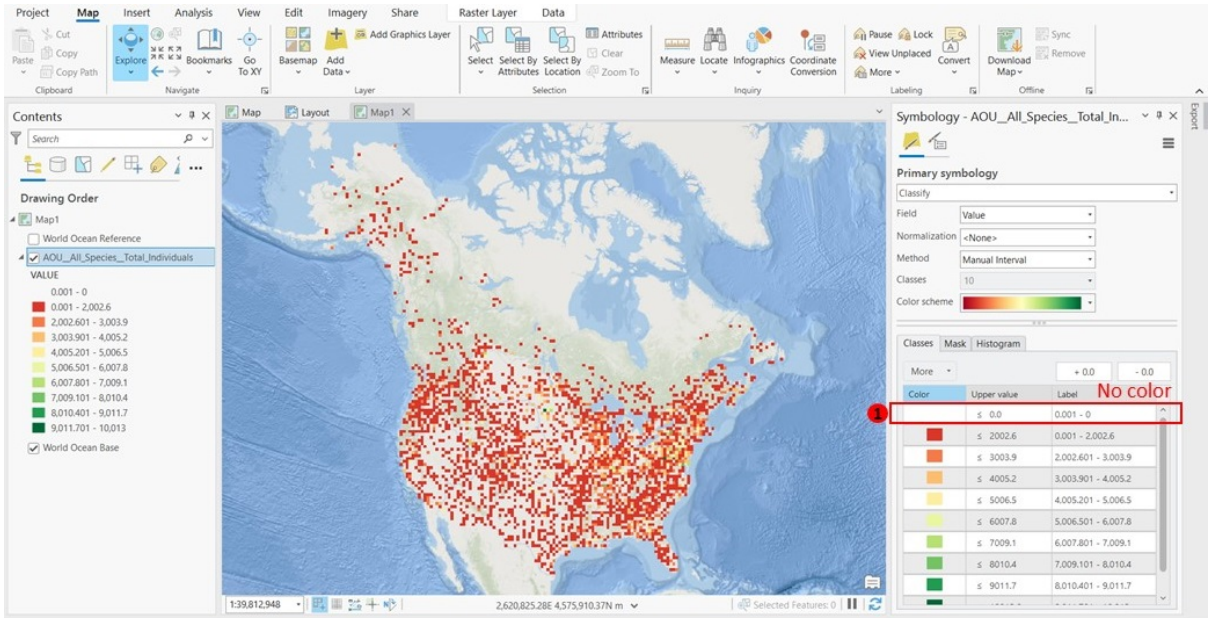

Figure 10: To make non-sighting points invisible

section. For a comprehensive understanding of this aspect, it is recommended to delve into this section in detail, exploring the various options available for a more nuanced and tailored representation of your data. (Figure 11).

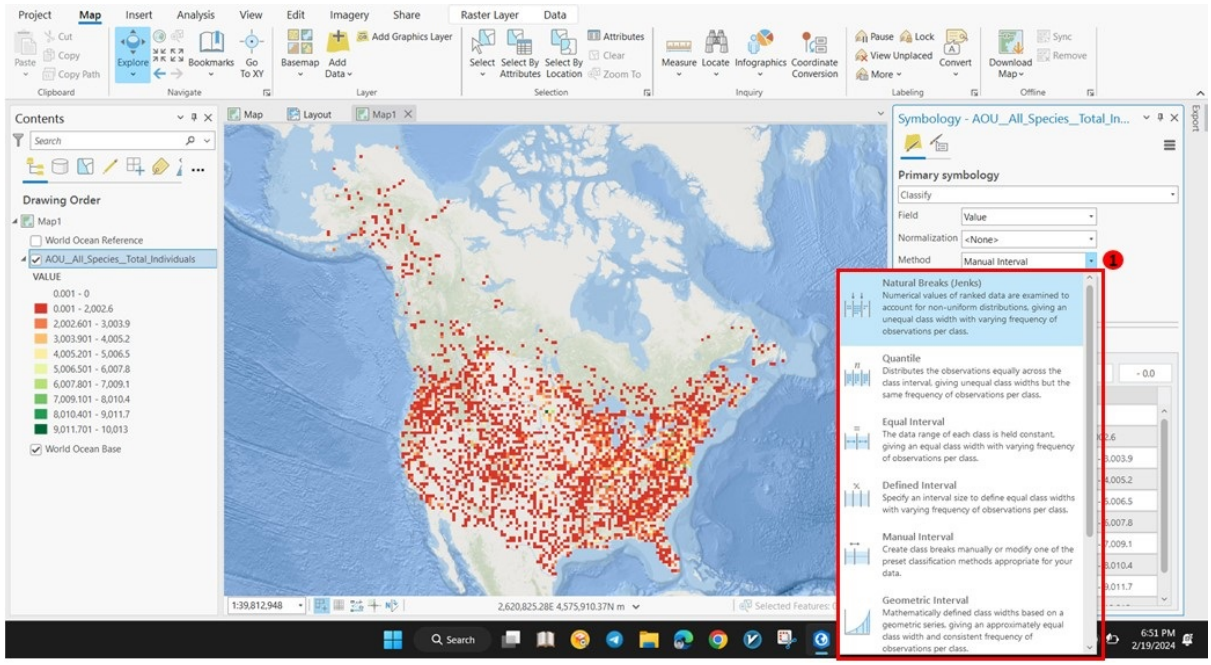

Figure 11: To explore alternative data visualization methods

9 To Customize final raster

Enhance the detailing of your raster, including features like S-N direction, coordinates, and image guides, by initiating the process with the *Insert tab*. Opt for a suitable layout by selecting *New Layout*. In this instance, commence with a blank layout, where you can establish the configuration for your final image. Within the *Insert* section, choose *Map Frame* to draw a rectangle of the desired size, serving as the

canvas for your map. This section provides the flexibility to customize extensively, ensuring your final raster meets your specific requirements precisely.(Figure 12).

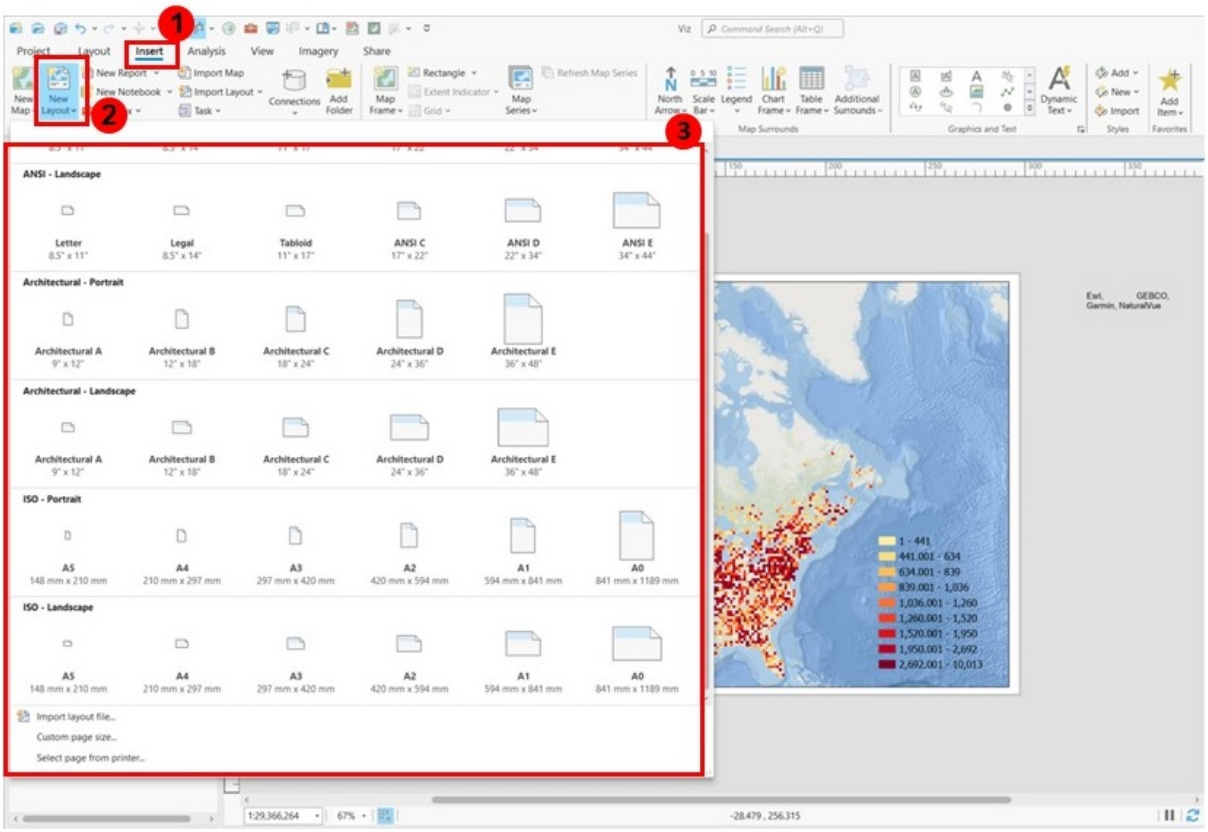

Figure 12: To add customized details to the Raster.

10 To export the raster

In the final step, conclude your raster creation process by exporting the prepared image. Navigate to the *Share tab* and choose the *Export Layout* option. Specify the file format, storage location, filename, and resolution within the *Export Layout*. In the *Color depth* section, opt for *24-bit True Color*. Subsequently, click on the *Export* button to effectively save your raster, marking the successful completion of the process. (Figure 13).

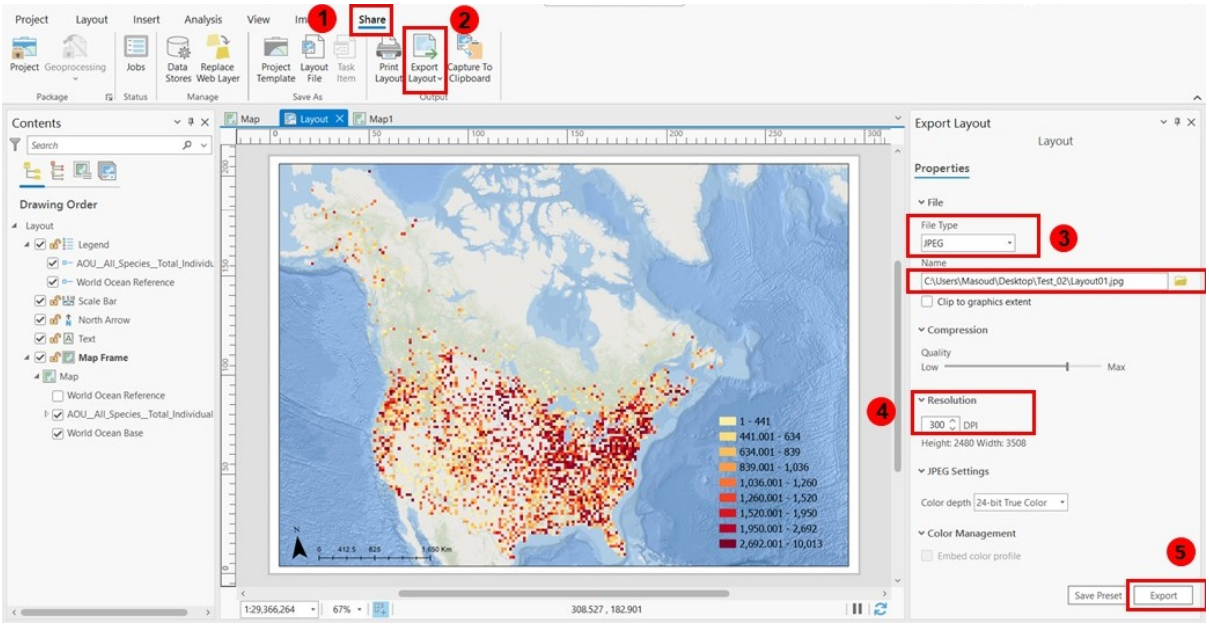

Figure 13: To export the Raster