Lifemapper on SAGE2

Michael Elliott, James Beach, CJ Grady, Aimee Stewart, José AB Fortes

ACIS — ADVANCED COMPUTING & INFORMATION SYSTEMS

Introduction

The purpose of this research is to make the **Lifemapper project** more accessible and more presentable by providing a streamlined collaborative interface adapted for the **SAGE2 platform**. The interface is based on the existing *BiotaPhy* interface, a collaboration of *iDigBio*, *Lifemapper*, and *Open Tree of Life*.

iDigBio — Integrated Digitized Biocollections   LM Lifemapper   OPEN Tree of Life

Background

Researchers from the University of Kentucky have developed *Lifemapper*, an online service for facilitating research on the distribution, migration, and phylogeny of organisms. Lifemapper ingests species occurrence and taxonomic data, then runs predictive models on that data to, for example, show where the selected species might be able to exist under both current and extrapolated climate conditions. The data is first retrieved from *iDigBio*, *Open Tree of Life*, and *Global Biodiversity Information Facility (GBIF)*, then compiled as a downloadable offline package that contains the collected species data and Lifemapper's model projections.
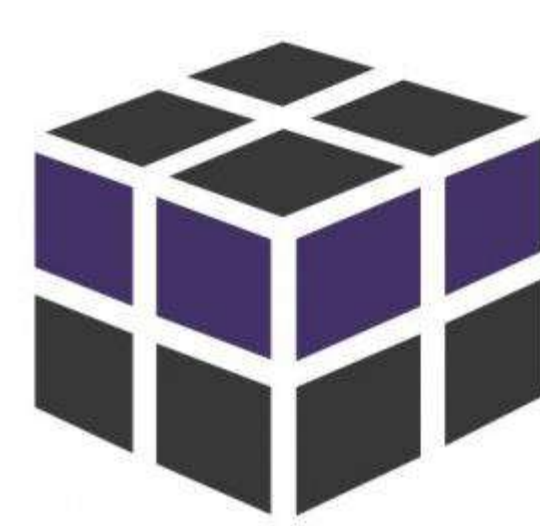
User selects data from *iDigBio, Open Tree of Life, GBIF* → *Lifemapper* runs predictive analysis → User downloads the *analysis package*

Deliverables

We deliver a system with the following functionalities:

❑ Users can upload their downloaded Lifemapper *packages* to SAGE2 to launch a "Lifemapper" application
❑ The SAGE2 application extracts and displays the following information from the *package*:
    ❑ A phylogenic tree
    ❑ Species occurrence data
    ❑ A number of biodiversity metrics, such as "alpha diversity"
    ❑ Predicted species distributions from selected models
❑ An interactive phylogenetic tree drives the application; allows users to:
    ❑ Select species *clades* to be displayed on a map
    ❑ Open scatterplots and maps that visualize biodiversity metrics derived from the aggregated species data
    ❑ Browse model projections for each species

At this time, to use the Lifemapper on SAGE2 interface, the user must first compile a *package* using the online *BiotaPhy* interface (http://client.lifemapper.org/biotaphy).

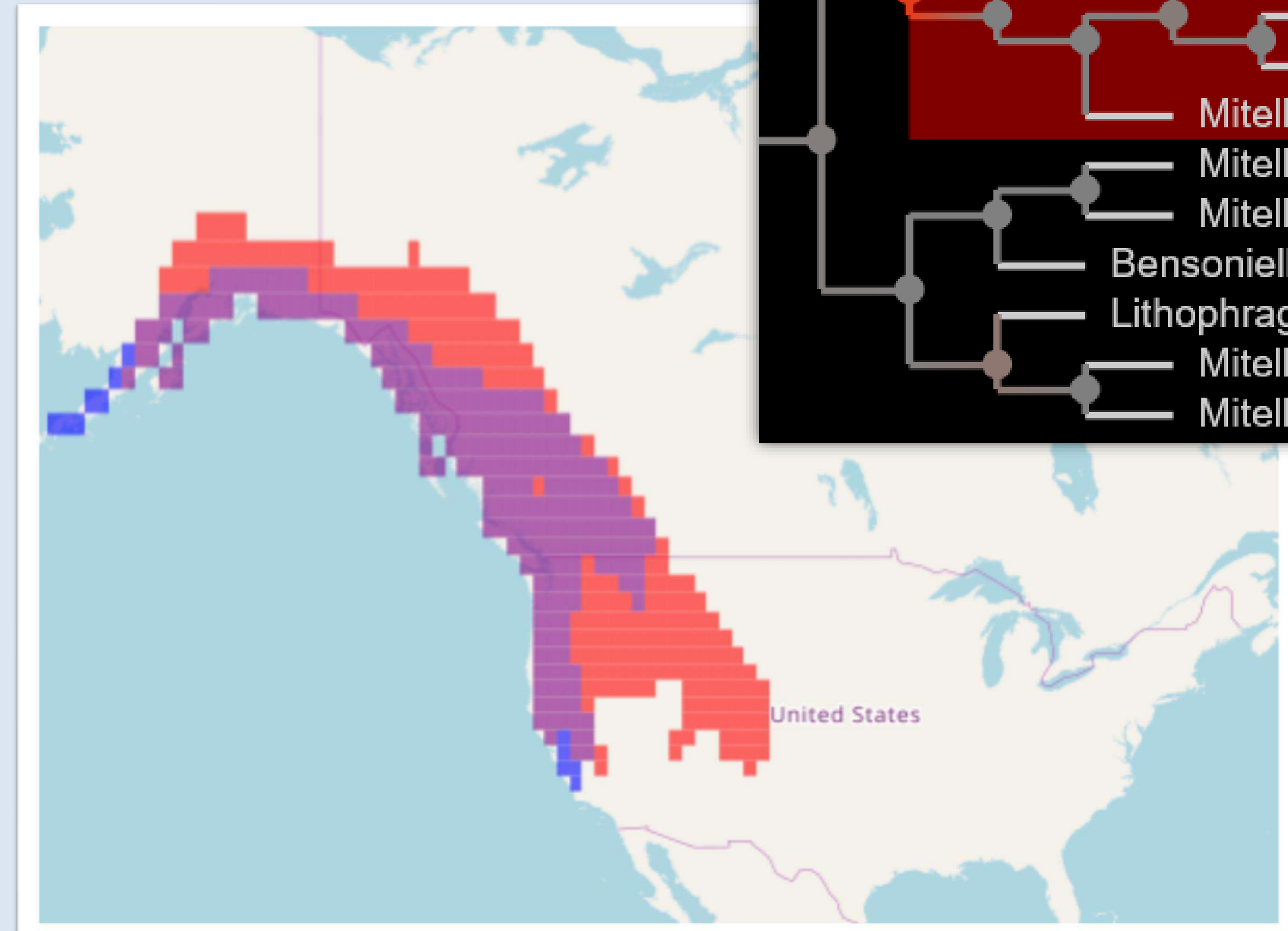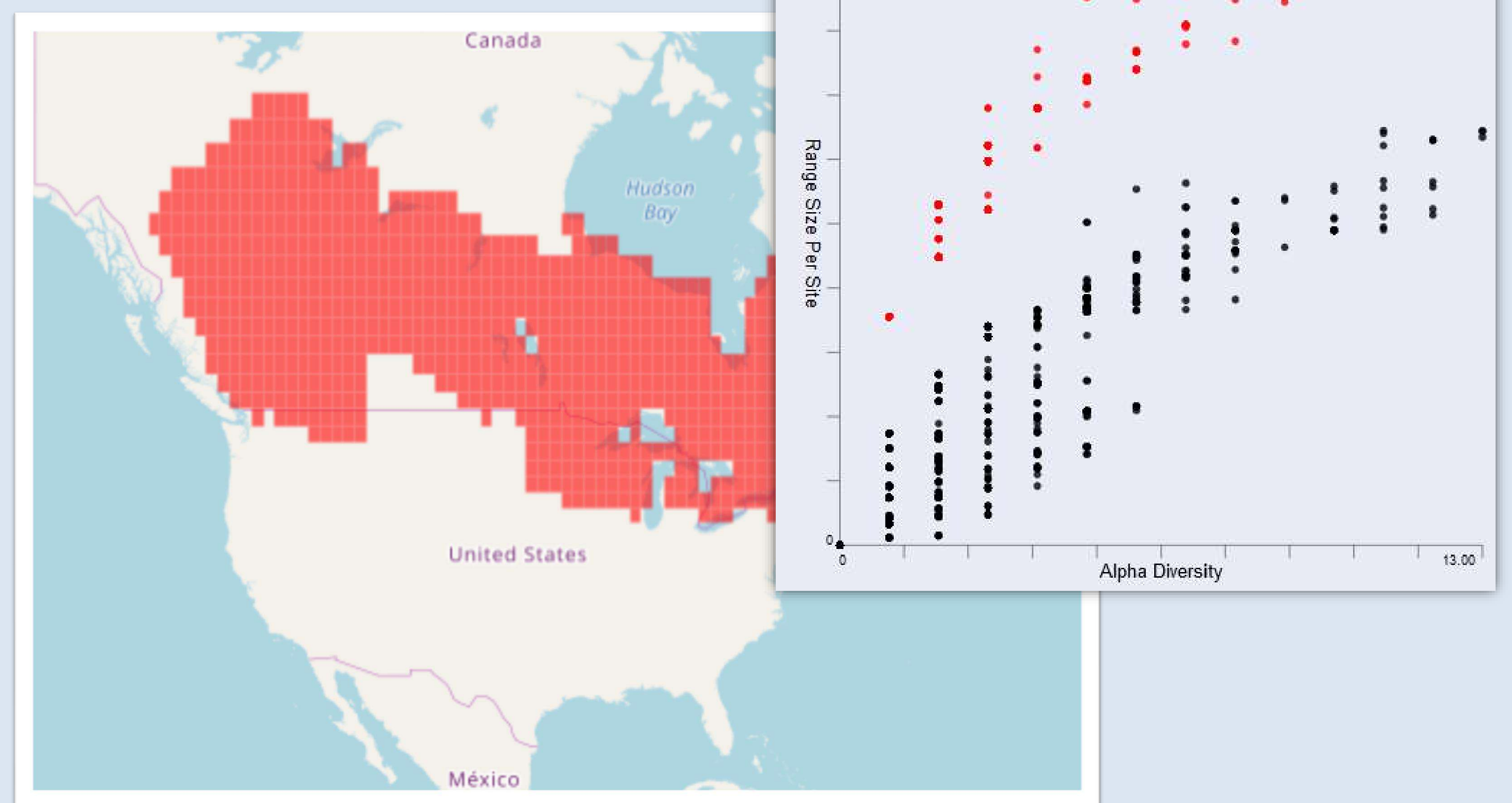**Figure 1.** Occurrence sites of the selected *clades*.

Figure 1. Occurrence sites with higher "*Range Size Per Site*"

Future Work

The SAGE2 application for Lifemapper is not yet fully complete. Future work will focus on making the entire analysis process possible from within the SAGE2 interface. Future work will include:

❑ An interface for submitting queries to Lifemapper to receive analysis results directly to SAGE2
❑ Functionality to augment, combine, and compare existing Lifemapper analysis packages
❑ More advanced interaction options
    ❑ Select multiple species groupings and display them on the map as different colors
    ❑ Allow the user to hover the cursor over each site to see site-specific data, such as present species and biodiversity metrics

Acknowledgements

UF | UNIVERSITY *of* FLORIDA