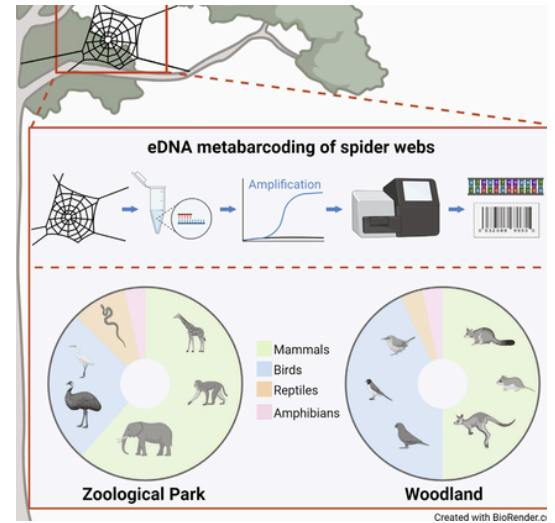


# Mapping a Plan to Monitor Biodiversity

## Application & Assessment

The assessment of DNA obtained from environmental samples, or “environmental DNA” (eDNA), has shown great promise as a non-invasive method for monitoring terrestrial biodiversity. With only trace amounts of DNA needed to identify species, the data obtained have the ability to strengthen biodiversity assessments through improving the detection and monitoring of rare, cryptic, or protected species, increasing the taxonomic resolution of biodiversity surveys, allowing for increased sampling of inhospitable or challenging environments to survey, and aiding in the early detection of invasive species. (Newton et al., 2024, p. 1)

Spider webs emerge from this study as a powerful natural biofilter for the eDNA detection of vertebrate species. Importantly, they are widespread within both natural and anthropogenic environments, spanning numerous ecosystems and microhabitats, and they require minimal sampling effort and no direct interaction with the target taxa. These are all features that promote spider webs as a cheap, easy-to-use, and non-invasive method for monitoring vertebrate species diversity (Newton et al., 2024, p. 5).



**Directions: Carefully read the paragraphs above to answer the following questions.**

According to the authors, what types of terrestrial species would benefit most from using eDNA for detection and monitoring?

According to the authors, what types of terrestrial environments would benefit most from using eDNA for detection and monitoring?

Recall what you learned about collecting and analyzing spiderwebs for vertebrate DNA. Where are spiderwebs most likely to be an effective source of species DNA? (Hint look at the graphs from the previous activity).

# Mapping a Plan to Monitor Biodiversity

## Half-Earth Project Map

**Directions:** Based on the criteria you identified on the first page of this activity, use the Half-Earth Project Map to identify one protected area likely to benefit from biodiversity sampling or monitoring using eDNA collected from spiderwebs.

Name of protected area

Type of protected area

Number of terrestrial vertebrate species

Climate regime

Percent protected

Human Population

Size in km<sup>2</sup>

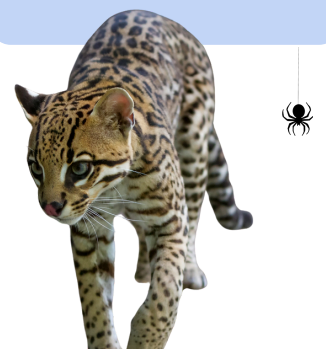
Are humans affecting the area? If yes, describe how (provide data points)

Land cover

In the space below, describe why you selected this area for spiderweb eDNA monitoring.

### Criteria to Consider:

- Richness (total species present)
- Rarity (geographically restricted species)
- Taxons most likely to shed airborne DNA into the environment
- Ease or difficulty of traditional field surveys for biodiversity monitoring. Indicators of access include human pressures such as:
  - Transportation to the area
  - Human intrusion



## Map of Life

Directions: Enter the name of your selected location into the **Map of Life**.

- Use the filters to identify **one species** in your selected protected area whose conservation may benefit from spiderweb eDNA sampling and monitoring.
- Use data from the Map of Life along with what you have learned about eDNA monitoring and the potential of using spider webs as a source of sampling airborne eDNA to respond to the questions below.

Species

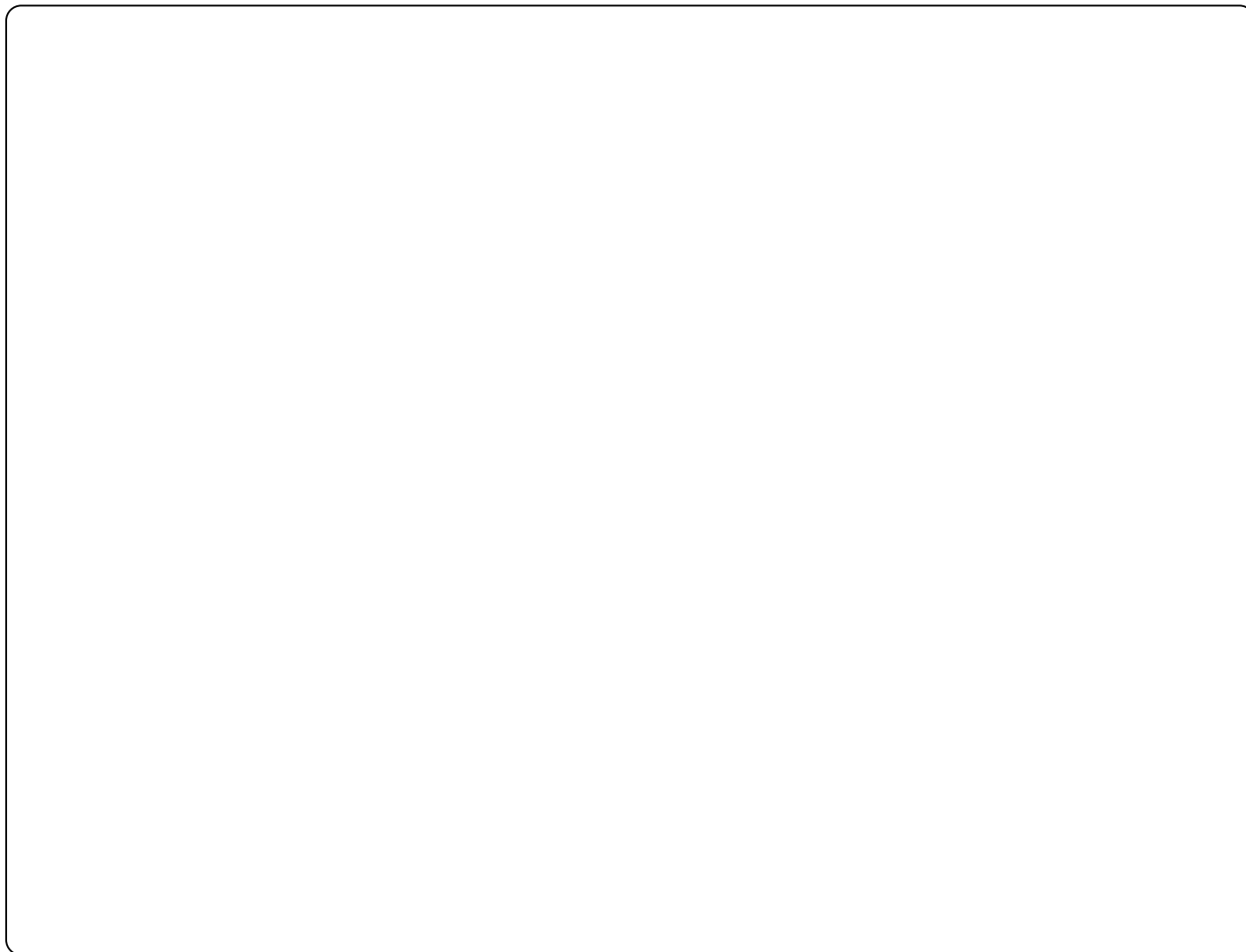
Write a paragraph describing in detail why collecting eDNA data in spider webs has the potential to improve the monitoring of this species.

# Mapping a Plan to Monitor Biodiversity

## Map of Life (continued)

Using historical species data such as regional checklists, local inventories, and points of observation, identify a location within the protected area where spiderweb samples would **most likely** contain DNA fragments from this species.

- Using your device's screen grab function, crop and paste an image of the location in the space below, marking and labeling 5-10 locations most ideal for collecting spider web samples.
- If you are unable to use screen grab, sketch the map in the space below. Do your best to include any geographic features to help identify the area. Draw and label 5-10 locations where you would collect spiderweb samples.



In 2-3 sentences provide a rationale for why you chose to sample spiderwebs for eDNA in the locations you marked in the map above.

