Mapping Conservation Opportunities for Habitat Areas

Ardath Dixon | Duke Nicholas School of the Environment | April 2021

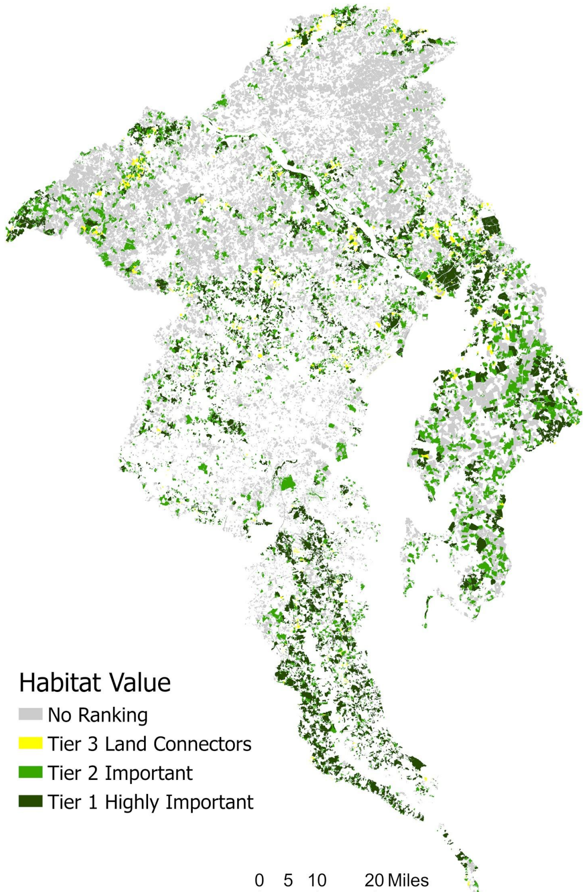
Biodiversity and Habitat Connectivity in the Chesapeake Bay Watershed

The Chesapeake Bay has over 3,600 species of plants, fish, and animals, making it North America's largest and most biodiverse estuary (Claggett et al., 2004). Environmental organizations have used a range of methods to quantify biodiversity and habitat land assets (Genellitti, 2004; Bagstad, 2013). Categorizing land as potential habitat areas is an option that does not require extensive field observations, yet can provide helpful recommendations. Habitat analysis can incorporate land cover, species' environmental needs, and connectivity pathways.

The canvasback is found in shallow, vegetated areas on the Chesapeake and tidal rivers. Credit: Dominic Sherony / Flickr / Chesapeake Bay Program

The Role of Conservation in Protecting Biodiversity

Intentionally conserving particularly biodiverse regions can prevent extinctions, and thus contribute to global conservation efforts (Pimm et al., 2018). Much biodiversity loss has been attributed to habitat loss, climate change, disease, fragmentation, and land-use changes (Dirzo et al., 2014). Conserving 30% of the Chesapeake Bay Watershed by 2030 and 50% by 2050 provides a venue to intentionally protect this region's rich biodiversity. Without this intentionality, the current trends of human-caused animal extinction are likely to continue (Dirzo et al., 2014). The Chesapeake Conservation Partnership created the layer used below to better inform conservation efforts across the Chesapeake Bay Watershed toward protecting habitat and biodiversity.



Spatial Analysis to Support Conservation of Biodiverse Habitat Lands

While several data layers demonstrating ecological assets are in circulation, this particular layer was selected due to scientific consultation and client recommendations. These data show three tiers representing an area's value, integrating core habitat for imperiled species, terrestrial cores, aquatic cores, and terrestrial cores connectors. We overlaid the parcels with this habitat layer and assigned each parcel a value representing the highest tier within its area. These values were converted to a 0-1 scale with a linear transformation, assigning a score to every parcel.

References

Bagstad, K. J., Semmens, D. J., Waage, S., Winthrop, R. (2013). A comparative assessment of decision-support tools for ecosystem services quantification and valuation. *Ecosystem Services*, 5, 27–39. https://doi.org/10.1016/j.ecoser.2013.07.004.

Claggett, P.R., Jantz, C., Goetz, S.J., Bisland, C. (2004). Assessing Development Pressure in the Chesapeake Bay Watershed: An Evaluation of Two Land-Use Change Models. *PubMed: Environmental Monitoring and Assessment*, 94 (1-3), pp. 129-146.

Dirzo, R., Young, H.S., Galetti, M., Ceballos, G., Isaac, N.J.B., Collen, B. (2014). Defaunation in the Anthropocene. *Science*, 345 (6195), pp. 401-406.

Geneletti, D. (2003). A GIS-based decision support system to identify nature conservation priorities in an alpine valley. *Elsevier*, https://doi.org/10.1016/j.landusepol.2003.09.005.

Pimm, S.L., Jenkins, C.N., Li, B.V. (2018). How to protect half of Earth to ensure it protects sufficient biodiversity. *Science Advances*, 4 : eeat2616.

Author contact: Ardath Dixon (she/her)
ardath.dixon@duke.edu | ardath.dixon@gmail.com