Dear Colleague

I'm writing today to request your assistance in obtaining fishery data for a collaborative research effort including myself, Travis Brenden, Kelly Robinson, and other researchers at Michigan State University, along with members of a Double-Crested Cormorant (DCCO) Technical Working Group comprised of state and federal fisheries and migratory bird biologists. The project is aimed at developing a management-support tool for determining if actions to control DCCO colonies may be justified due to excessive predation on fish populations occurring within a colony's feeding halo. To help in this endeavor, we are asking fishery managers, biologists, and/or researchers if they would be willing to share with us species-specific or community estimates of fish production or biomass for lentic systems (details for data below).

The focus of our data request is to evaluate existing published models (e.g., morphoedaphic model) for predicting potential fish community production (i.e., surplus biomass) in lakes and impoundments throughout the U.S., including bays and archipelagos of the Great Lakes. Additionally, we are looking to build new models for predicting species-specific or community production values based on readily available data with a focus on those that can be found in different geographic information system (GIS) databases. These prediction models are intended to provide a means for broadly assessing the capacity of a system to sustainably absorb increased predation pressure (by DCCO or some other predator). The project is funded by the USFWS Migratory Bird Division, USDA\WS\Natl. Wildlife Research Center, and the Great Lakes Fish and Wildlife Restoration Act.

We will be relying heavily on fish production databases that have already been compiled and made publicly available online (e.g., Rypel and Solomon 2017). However, we also are looking to supplement this existing information with other estimates of fish production (species-specific or community production) in lentic (ponds, lakes, reservoirs) systems that might be readily available. Fish production values that have been generated with any of the commonly accepted approaches (e.g., instantaneous growth method, size-frequency method, Allen curve) would be useful to us. Similarly, species-specific or community biomass estimates derived from different approaches, including (1) fish poisoning surveys where known areas of aquatic ecosystems were poisoned and the mass of individual species from the known area measured; (2) hydroacoustic surveys of pelagic fish species where the total biomass of populations could be estimated using target strengths from hydroacoustic survey; (3) mark–recapture studies where a population estimate was made and combined with size and weight information to generate a biomass value would also be quite helpful. We are seeking both production and biomass data because we anticipate production data may be limited, but we could calculate production from biomass based on published P/B ratios. If full production and biomass estimates are unavailable, measures of relative abundance, such as survey net catch rates, would also be useful. In addition, any fishery-independent CPE data that correspond with production or biomass estimates could be beneficial in developing equations to predict biomass from CPE values.

In evaluating models such as the morphoedaphic index (MEI) for predicting potential fish community production and matching that with variables commonly included GIS databases, it has become evident that total dissolved solids (TDS), which was one of the inputs in the original MEI, is not a variable that is frequently measured. Therefore, we are interested in developing models that can predict MEI based on variables that are more commonly measured and included in GIS databases (total phosphorous, total nitrogen, conductivity). Thus, data with paired measures of TDS and water quality variables like total

phosphorous, total nitrogen, and conductivity to allow for established models like the MEI to be used are important for this project.

Finally, we are primarily working from the list of lakes available in the LAGOS database (Soranno et al 2017), all of which are identified by a unique number, latitude and longitude, and lake name if available. To ensure that any data you are willing to provide can be easily matched to the systems in LAGOS, and to verify whether these data are already available in LAGOS, please include any identification data that are available. These data include waterbody name, any lake/reservoir ID number if available (state, federal, or otherwise), latitude and longitude, sampling date and protocol, and organization affiliation.

If you have data available, and are willing to share, please contact me by email at maguffee@msu.edu. We would appreciate receiving this data by the end of the calendar year 2020, so we can proceed with developing this support tool. Questions about this request or project can be directed to myself, Travis Brenden (brenden@msu.edu), or Kelly Robinson (kfrobins@msu.edu).

Sincerely,

Alex Maguffee

Rypel, A.L., and D.R. Solomon. 2017. Patterns and scale in latitude-production relationships for freshwater fisheries. Ecosphere 8:e01660.

Soranno, P.A. et al. 2017. LAGOS-NE: A multi-scaled geospatial and temporal database of lake ecological context and water quality for thousands of U.S. lakes. Gigascience 6(11): https://doi.org/10.1093/gigascience/gix101.