ARE ALGAL BLOOMS DRIVING WADING BIRDS AWAY FROM LAKE CHAMPLAIN?

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Background

- Cyanobacteria blooms along Lake Champlain's coasts have known negative impacts on fish, pets, and humans.
- Bloom driven die-offs in seabirds and filter feeders exists, but there has not been a focus on population density (Van Hermet et al., 2020).
- Algal blooms have been increasingly prevalent along Champlain's coast, adding to the need for research (Torbick et al., 2015)

Motivation

- There is a large gap in the literature with regards to cyanobacteria bloom effects on wading birds in freshwater.
- Migrant bird conservation draws huge amounts of funding Ducks Unlimited, Audubon Society, Pittman Robertson Act, Migratory Bird Conservation Act)
- The fight against eutrophication in Lake Champlain would greatly Benefit from such funding.

Hypothesis

Wading bird abundance along Lake Champlain's coast is related to cyanobacteria presence (Figure 1).

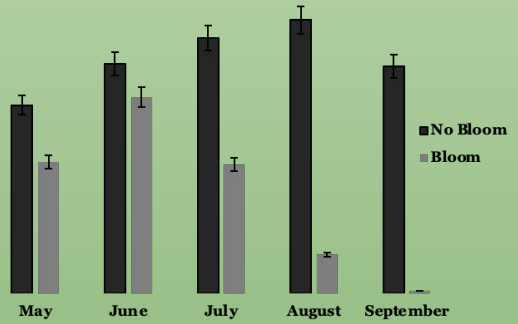

Figure 1. Three year average population density across all survey areas.

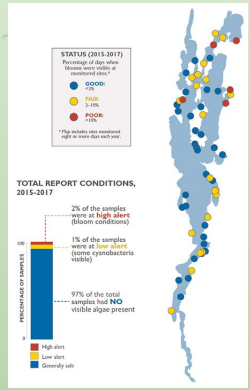

Figure 2. Cyanobacteria bloom status history 2015-2017 (Lake Champlain Basin Program).

Figure 3. Survey sites (2,500 square meters each) based on information from figure 2.

Methods/Design

- ❏ Weekly one hour point count surveys on six sites, 3 with bloom; 3 no bloom, (figure 3).
- ❏ 3 focal species recorded: Great Blue Heron, Great Egret, Least Bittern
- ❏ Count for individuals spotted 25m in any direction from transect.
- ❏ Surveys before and during traditional bloom span (May-September).
- ❏ Replicated for three years.

Predictions

- Wading bird density will decrease in areas when cyanobacteria blooms are active.
- Wading bird density will increase in areas without cyanobacteria activity when blooms occur as well.

Intended Analysis

- Population density calculations will be applied to site data, all six, individually; the bloom sites and non-bloom sites collectively at the end of each year; total three year calculation for both condition.
- All density calculations will combine species data, with an additional calculation for each species' three year density totals across all sites.

Figure 4. Blooms of harmful algae have plagued Lake Champlain for the better part of this century. Negative impacts to fish and humans is well documented, less is known for impact on birds.

Potential Benefit

- Financial benefits associated with proving a threat to migratory bird habitat.
- Information on bird responses to repeating negative stimuli.
- Algal blooms occur traditionally in the same location year after year. If results show that birds begin to avoid areas with traditional blooms before blooming occurs we can infer a similar response as passerines and game fowl to deforestation.

Literature Cited: 2014 blue-green Algae Recap. (n.d.). From https://www.lakechamplainbasinprogram.org/learn/news/item/2014-blue-green-algae-recap ; Torbick, N., & Corbiere, M. (2015). A multiscale mapping assessment of lake champlain cyanobacterial harmful algal blooms. *International Journal of Environmental Research and Public Health, 12*(9), 11560-11578. Doi:10.3390; Van Hemert, C., Schoen, S. K., Litaker, R. W., Smith, M. M., Arimitsu, M. L., Piatt, J. F., . . . Pearce, J. M. (2020). Algal toxins in Alaskan seabirds: Evaluating the role of SAXITOXIN And domoic acid in a large-scale die-off of common murres. *Harmful Algae, 92*, 101730. doi:10.1016