Cuban Bulrush Biotype Response to Herbicide Treatments in Florida Field Locations – Interim Report

An Interim Report to the Florida Fish and Wildlife Conservation Commission

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BACKGROUND

The purpose of this project was to investigate short and term control of Cuban bulrush biotypes with various herbicide treatments at field locations in Florida. An additional component of this work was to monitor impacts to native vegetation by herbicide treatments.

METHODOLOGY

Research sites were selected on Lake Fannie, Lake Rousseau, Flying Eagle Preserve, Orange Lake, Lake Talquin, Lake Carr, and Deer Pointe Reservoir (Figure 1). Four treatment plots and a reference plot were delineated in each waterbody (35 plots total). Prior to herbicide treatment, one biomass sample was harvested from each plot to establish a baseline of plant growth. Percent cover of all plant species within a plot was recorded. Biomass was harvested by placing a 0.1 m^2 PVC frame in each plot and harvesting all biomass within the frame. Biomass was shipped overnight to Mississippi State University (MSU) for processing. At MSU, inflorescences were counted in each sample, then samples were separated into emergent and submersed biomass, placed in labeled paper bags, and dried at 70C in a forced air oven for 5 days. After drying, biomass weight was measured and recorded.

Herbicide treatments were administered late summer 2021 (Table 1). Eight weeks after treatment (WAT), the percent cover of plants in each plot was recorded and five biomass samples per plot were harvested, shipped to MSU, and processed in the same manner as pre-treatment samples. Data collection will occur again in summer 2022 to determine long term effects of herbicides on Cuban bulrush and the native plant community.

A mixed model analysis of variance (ANOVA) using herbicide treatment as a fixed effect and lake as a random effect was conducted to assess Cuban bulrush biomass response to herbicide treatments 8 WAT. If differences were detected, a Fishers LSD test was utilized to separate treatment means (R Core Team 2021). All statistical tests were conducted at the alpha = 0.05 significance level.

RESULTS AND DISCUSSION

All herbicide treatments reduced Cuban bulrush emergent biomass ($p=0.0109$) 87 to 99% compared to reference plants 8 WAT (Figure 2). Submersed biomass was reduced 70 to 85% compared to reference plants 8 WAT ($p=0.0026$; Figure 2). Final biomass assessment will occur in summer 2022. Visual assessment of treatment plots suggests that plots treated with triclopyr may be degrading faster than those treated with other herbicides. Assessment of the plant community in each plot will occur summer 2022.

CONCLUSIONS

- All herbicide treatments provided reduction of Cuban bulrush biomass 8 WAT.

- Final biomass harvest will determine long term effects of herbicide treatments used in this trial.
- Assessment of the plant community will determine if any of the herbicides used here provided selective control of Cuban bulrush.

LITERATURE CITED

R Core Team. 2021. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. Www.R-project.org/. Date Accessed: 12-1-2021.

TABLES AND FIGURES

Table 1. Herbicide treatments administered to Cuban bulrush plots in Florida; each treatment included 0.5% v:v NIS.

HERBICIDE	RATE
Reference	-
Triclopyr	192 oz/ac
Diquat	96 oz/ac
FPB	1.35 oz/ac
Glyphosate + Flumioxazin	120 + 3 oz/ac

Figure 1. Image identifying Florida lakes used for treatment plots.

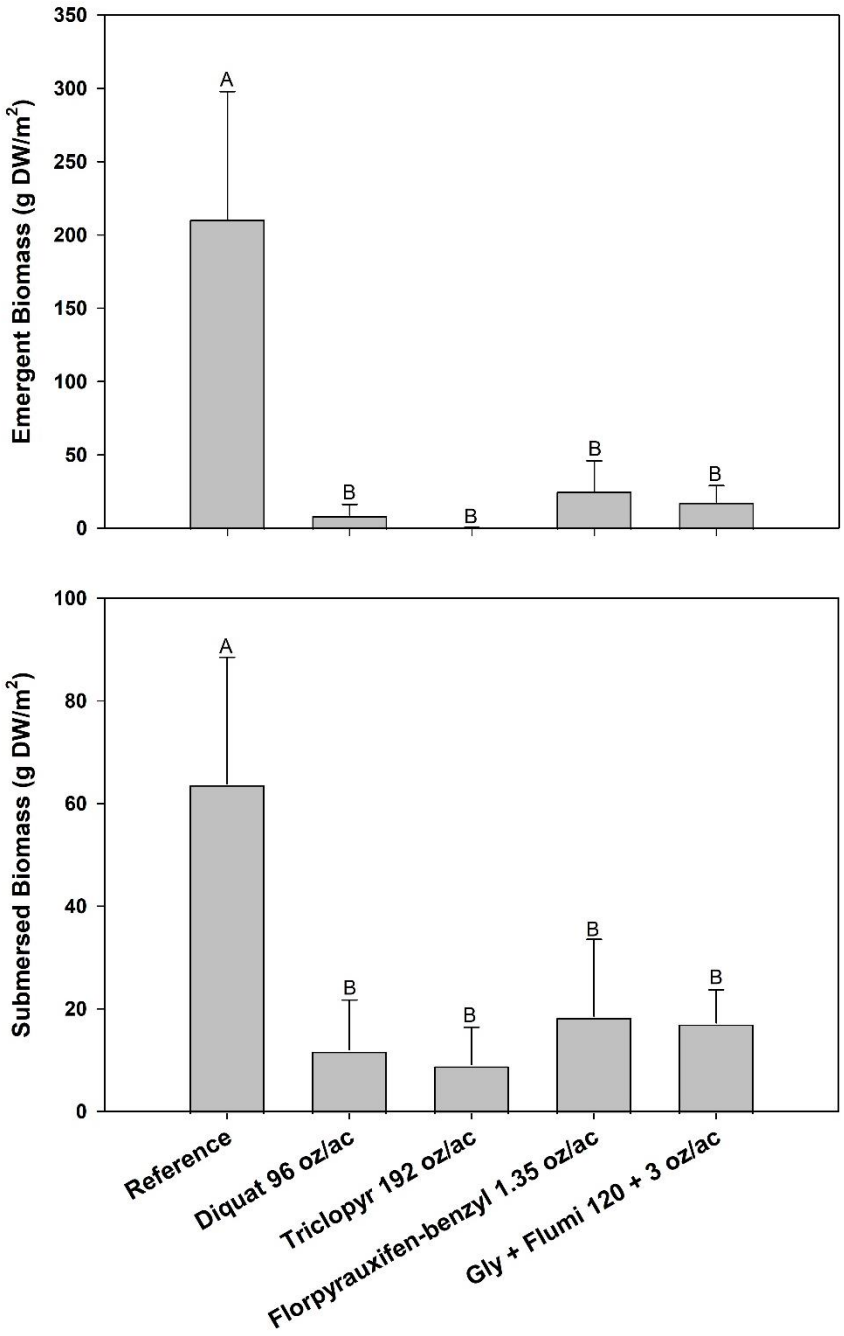

Figure 2. Emergent (top panel) and submersed (bottom panel) Cuban bulrush biomass 8 WAT; error bars are one standard error of the mean; bars sharing a letter are not different at the alpha = 0.05 significance level.