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Effects of Cattail Management on Avian Diversity and Abundance

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The effects of wetland habitat alteration on avian diversity and abundance were studied in northeastern North Dakota during June, July, and August 1990-92. We selected 12 semipermanent wetlands (Type IV) in 1990 and randomly assigned one of the following three treatment levels to each wetland: 70% areal spray coverage with aerially applied glyphosate herbicide (5.8 l/ha; RODEO formulation), 90% spray coverage, or untreated (controls). One control wetland was deleted from the analysis because of cattle grazing.

In 1991 (one year post-treatment), the ratios of live emergent vegetation (LEV), dead emergent vegetation (DEV), and open water (OW) in these test wetlands were (LEV:DEV:OW): controls - 60:18:16; 70% treated - 31:32:20; and 90% treated - 13:50:29. In 1992 (two years post-treatment), the ratios of LEV:DEV:OW changed to: controls - 51:15:23; 70% treated - 30:15:30; and 90% treated - 29:24:34. The remaining habitats consisted of vegetation and bare ground on the edges of the wetland basins.

The Shannon-Weaver index was used to calculate an avian diversity number for each of these wetlands. Additionally, the total numbers of bird species observed in the wetlands were compared among treatments. Diversity ranged from 1.8 to 2.7 during June, July, and August 1990-92. There were no differences in avian diversity among treatments. In 1991 and 1992, species richness did not differ among treatments (all P 's >0.446) or between years ($P = 0.712$).

In 1991, we randomly designated 12 additional wetlands as either untreated or receiving 50% or 70% areal spray coverage. In 1992 (one year post-treatment), the ratios of live emergent vegetation, dead emergent vegetation, and open water were: controls - 57:10:13; 50% treated - 17:46:15; and 70% treated - 11:61:12.

Avian diversity was stable among all treatment levels during 1991 and 1992, ranging from 1.8 to 2.6. Species richness in 1992 showed no difference during June or August (all P 's >0.299); however, there were significantly more species during July 1992 in the 50% and 70% treatment wetlands compared to the control wetlands ($P = 0.069$).

Avian diversity and richness were highly correlated with habitat diversity. Generally, wetland communities were low in habitat diversity due to their one-layered vegetation structure. We expected that avian species requiring dense emergent vegetation for nesting and feeding (e.g., blackbirds) would be negatively influenced by the reduction in cattails (*Typha* spp.), whereas, species requiring a good interspersion of emergent vegetation and open water (e.g., waterfowl) would benefit from cattail management. However, our preliminary data indicate that after one to two years post-treatment, bird diversity and richness were not influenced by the glyphosate applications and subsequent cattail habitat reduction.

After several years post-treatment, species diversity and richness may increase as the ratio of emergent vegetation and open water approach an ideal interspersion. However, we caution that a broad-scaled cattail eradication program could potentially negatively impact bird populations in these wetlands.