

USING COLOR-INFRARED PHOTOGRAPHY AND GIS TO QUANTIFY CATTAIL COVERAGE IN WETLANDS

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Abstract: Analyzing changes in habitat features at very large scales with GIS requires digital images with both high spatial and spectral resolutions. As part of an experiment to reduce blackbird (*Icterinae*) damage to sunflower in North Dakota, we used large-scale infrared photography to monitor regrowth of herbicide-treated cattail (*Typha* spp.) in wetlands used by roosting blackbirds. We aerially photographed the wetlands at 460–610 m above ground level. All photographs were taken vertically through a 38-cm diameter port in the floor of the plane's fuselage. We used a SLR 35-mm camera loaded with Kodak Ektachrome[®] Professional Infrared EIR film. The photographs were shot through a 24-mm lens; a Wratten #12 filter and haze filter were attached to the lens to counteract blue light effects and improve clarity. The ground cell resolution was ~1 m for the photographic images. To reduce distortion and shadowing of the ground features, photographs were taken nearly perpendicular to the wetlands on cloudless days from 1100 to 1400 h CT. Film speed was set manually at EI 100, the recommended speed for the AR-5 developing process used for infrared accuracy. Shutter speed and aperture settings were 1/500 sec and *F*-5.6, respectively. The developed images were scanned at 2,100 pixels/inch with a Polaroid[®] Sprint Scan 35 Plus. The scans were converted to Tagged Image Format files. File size was ~16MB. We used ArcView[®] 3.2a software with the Image Analysis extension to categorize pixels into four habitat features through a supervised classification. Annual changes in proportions of living cattail, dead cattail, open water, and floating vegetation were tracked from 1999–2002. A pixel-based coordinate system was used to coregister raster images of wetlands across years. Changes in the proportions of categorized features were tracked through time by summarizing pixel counts between coregistered rasters. We suggest this approach of data acquisition and analysis when monitoring habitat changes at very large spatial scales.

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