Wildlife Conservation Sunflower Plots as a Dual-Purpose Wildlife Management Strategy

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ABSTRACT: The National Sunflower Association has identified blackbird damage as a key reason for growers to abandon sunflower. In the 1980s, National Wildlife Research Center scientists showed that "decoy" plantings of sunflower can significantly reduce bird damage to nearby commercial sunflower fields. For a variety of reasons, largely logistical and economic in nature, decoy sunflower fields did not become wide-spread. Over the last decade, new federal farm programs have placed more emphasis on wildlife conservation. Thus, decoy sunflower fields planted to ameliorate blackbird damage and establish habitat for wildlife might garner broad support from both agricultural and conservation groups. We present preliminary data on avian use of ripening sunflower fields that support the notion of "Wildlife Conservation Sunflower Plots" (WCSP) as a broad-based dual-purpose wildlife management strategy. We also outline research plans designed to refine the concept of WCSP.

KEY WORDS: birds, blackbirds, grasslands, migration, sparrows, sunflower, wetlands

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INTRODUCTION

The Prairie Pothole Region of North Dakota and South Dakota is the center of the United States' commercial sunflower crop (NDASS 2003). This region contains numerous shallow wetlands that are used by nearly 140 avian species (Kantrud et al. 1989). Some of these wetlands feature homogenous stands of dense cattails (*Typha* spp.) that provide ideal roost substrate for large aggregations of blackbirds (Icteridae) that damage sunflower (Linz and Hanzel 1997). Wildlife Services biologists have shown that thinning of cattail-choked wetlands with glyphosate-based herbicide will effectively disperse large concentrations of blackbirds (Linz et al. 1995) and is generally beneficial to most wetland-dwelling birds (Linz et al. 1996, Linz and Blixt 1997).

Sunflower damage is still prevalent, however, because the birds move to other suitable locations to feed on sunflower. Bird damage management techniques such as mechanical scare devices, bird repellents, avicides, and shooting are problematic at best and can be hazardous (Linz and Hanzel 1997). Some of these methods, however, might prove to be more effective if alternative foraging sites were available (Avery and Cummings 2003).

Cummings et al. (1987) showed that decoy plantings of sunflower can significantly reduce bird damage to nearby commercial fields. For a variety of reasons, largely logistical and economic in nature, the use of decoy sunflower fields has not become widespread. For example, to implement an effective, widespread program, coordinators would need to identify and prioritize plot locations and landowners with historical blackbird damage; monitor the plots for blackbird use; and perhaps most importantly, acquire program funds. These obstacles might be overcome with the use of advanced geospatial technologies and expanding the objectives of sunflower decoy plantings to attract federal, state, and private conservation dollars.

Sayler and Trevor (1990) surveyed sunflower fields from May through August and found 22 resident passerine birds. Resident bird-use of sunflower fields is not surprising considering that some fields contain heavy stands of weeds (Zollinger and Dexter 1994) and host a plethora of arthropods (Charlet et al. 1997). In this paper, we provide data showing that commercial sunflower fields also are used by fall migrating birds (Schaaf 2003).

From mid-August to mid-October 2000, we identified and quantified birds in ripening sunflower fields. Our immediate aim was to evaluate the importance of sunflower as habitat for migrating and resident birds. Our long-term objective was to use this information to develop an environmentally friendly blackbird management strategy, "Wildlife Conservation Sunflower Plots (WCSP)," that might garner broad support from both agricultural and conservation groups.

METHODS

Study Area

Our study was carried out in Barnes and Stutsman Counties, in east-central North Dakota (47.0° N, 98.5°

W). These counties, known for an abundance of shallow wetlands, lie in the southern Drift Plains in the Prairie Pothole Region of the northern Great Plains (Stewart 1975). Originally open mixed-grass prairie, most of this area has now been converted to cropland, and planted tree rows are common.

In 2000, sunflower plantings in Barnes (24,000 ha) and Stutsman (39,000 ha) counties averaged <1% of the cultivated land (NDASS 2003). Sunflower is planted at a rate of about 49,000 plants/ha in May and June, forms a dense leafy canopy by late July, and typically is harvested in October and November, yielding an average of 1640 kg/ha (NDASS 2003).

Bird Counts

We randomly selected 12 oilseed variety sunflower fields (range 26 - 66 ha) and established 10 census points within the fields. Six census points were placed 25 m from the field perimeter, and 4 census points were located in the field. Each field had at least one wetland within 75 m of the field edge.

From 22 August to 11 October, 2 trained observers visited each of the 12 fields 7 times, for a total of 84 field surveys. For each field, direction of travel was changed on every visit, and the 2 observers alternated between visits. We began the census within 15 min of sunrise. Upon arriving at a count point, we climbed a 1.8-m stepladder and maintained a 2-min quiet period before beginning an 8-min census. Counts took 3 to 4 hrs to complete, depending on the distance between points.

Habitat Measurements

We collected vegetation data from 3 randomly selected 1-m diameter vegetation plots within 25 m of each census point, and identified all plant species. Percent cover was estimated for grasses, and the number of stems was counted for all forbs and for sunflower.

We took aerial photographs of the study fields and analyzed the photographs using ArcView GIS 3.2 (Environmental Systems Research Institute, Inc., Redlands, CA) software to quantify the area of available habitat cover types. Habitat area was determined within 805 m of the study field. Nearby crops were identified using the 2000 National Agricultural Statistics Service (USDA) Cropland Data Layer for North Dakota.

RESULTS

Habitat

Within the 805-m perimeter of the study fields (Figure 1), the main habitat types were small grains (38%), wetlands (20%), grass (11%), sunflower (9%), and beans (6%). All study fields were surrounded by small areas of adjacent tree rows.

Within the study fields, average percent coverage of grasses was 5.8% (SD = 10.2) and average numbers of forb stems was 11.8 (SD = 13.1) stems/m^2. Sunflower density and sunflower height averaged 5.9 (SD = 0.85) and 1.9 (SD = 0.24) stems/m^2, respectively.

Bird Counts

We observed 49 nonblackbird species in or over the sunflower fields (Table 1). Of those 49 species, 30 (61%) were granivores, including 16 species of sparrows and 3 species of finches. Granivores made up 74% of all birds counted in both the field and field edges (Figure 2). Of 2,159 birds recorded in sunflower, 66% were granivores, 21 were insectivores, and 10% were unidentified (Figure 3). The most common sparrows were song sparrows, grasshopper sparrows, clay-colored sparrows, dark-eyed

Table 1. Species and numbers of birds observed in study sunflower fields in Barnes and Stutsman Counties, North Dakota.

Common Name	*Scientific Name*	Number
Clay-colored Sparrow	*Spizella pallida*	53
Field Sparrow	*Spizella pusilla*	22
Grasshopper Sparrow	*Ammondramus savannarum*	128
Harris' Sparrow	*Zonotrichia quaerula*	25
House Sparrow	*Passer domesticus*	1
LeConte's Sparrow	*Ammondramus leconteii*	3
Lincoln's Sparrow	*Melospiza lincolni*	24
Savannah Sparrow	*Passerculus sandwichensis*	44
Dark-eyed Junco	*Junco hyemalis*	48
Smith's Longspur	*Calcarius pictus*	8
Song Sparrow	*Melospiza melodia*	154
Sharp-tailed Sparrow	*Ammodramus nelsoni*	1
Swamp Sparrow	*Melospiza georgiana*	1
Vesper Sparrow	*Pooecetes gramineus*	18
White-crowned Sparrow	*Zonotrichia leucophyrys*	4
White-throated Sparrow	*Zonotrichia albicollis*	4
Unidentified Sparrow	*Emberizidae*	374
American Goldfinch	*Carduelis tristis*	405
House Finch	*Carpodacus mexicanus*	1
Purple Finch	*Carpodacus purpureus*	2
Mourning Dove	*Zenaida macroura*	195
Gray Partridge	*Perdix perdix*	1
Ring-necked Pheasant	*Phasianus colchicus*	5
Sharp-tailed Grouse	*Tympanuchus hasianellus*	10
Bobolink	*Dolichonyx oryzivorus*	1
Western Meadowlark	*Sturnella neglecta*	2
Blue Jay	*Cyanocitta cristata*	10
American Crow	*Corvus brachyrhynchose*	27
Black-capped Chickadee	*Poecile atricapillus*	26
Brown Thrasher	*Toxostoma rufum*	1
Killdeer	*Charadrius vociferus*	1
Common Yellowthroat	*Geothylpis trichas*	19
Mourning Warbler	*Oporornis philadelphia*	1
Myrtle Warbler	*Dendroica coronata*	28
Western Palm Warbler	*Dendroica palmarum*	94
Unidentified Warbler	*Parulidae*	12
House Wren	*Troglodytes aedon*	12
Marsh Wren	*Cistothorus palustris*	7
Unidentified Wren	*Troglodytidae*	1
Eastern Kingbird	*Tyrannus tyrannus*	16
Unidentified Flycatcher	*Tyrannidae*	4
Willow Flycatcher	*Empidonax trailii*	3
Downy Woodpecker	*Picoides pubescens*	2
Northern Flicker	*Colaptes auratus*	3
American Robin	*Turdus migratorius*	127
Baltimore Oriole	*Icterus galbula*	1
Bank Swallow	*Riparia riparia*	43
Barn Swallow	*Hirundo rustica*	39
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	92
Tree Swallow	*Tachycineta bicolor*	3
Northern Harrier	*Circus cyaneus*	47
Red-tailed Hawk	*Buteo jamaicensis*	2
Sharp-shinned Hawk	*Accipiter striatus*	4
Total Blackbirds	Icteridae	112,009

juncos, and savannah sparrows (scientific names in Table 1). We counted 16 upland game birds, including 10 sharp-tailed grouse, 5 ring-necked pheasants, and 1 gray partridge. Other seed-eating birds recorded included 10 blue jays, 27 American crows, and 26 black-capped chickadees.

We observed 507 insectivores and frugivores, consisting of 16 species. Swallows comprised 35% of this category, followed by 30% warblers, and 25% American robins. Of the 153 warblers counted, 61% were palm warblers, and 18% were yellow-rumped warblers. We saw 53 raptors and 5 woodpeckers foraging over sunflower, including 47 northern harriers, 2 red-tailed hawks, 4 sharp-shinned hawks, 2 downy woodpeckers, and 3 northern flickers in the fields.

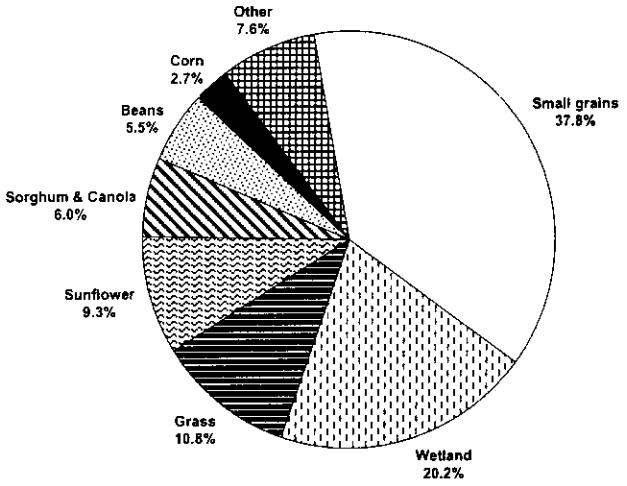

Figure 1. Mean percent coverage of habitat types within 805 m of study sunflower fields (n = 12) in Barnes and Stutsman Counties, North Dakota, in Fall 2000.

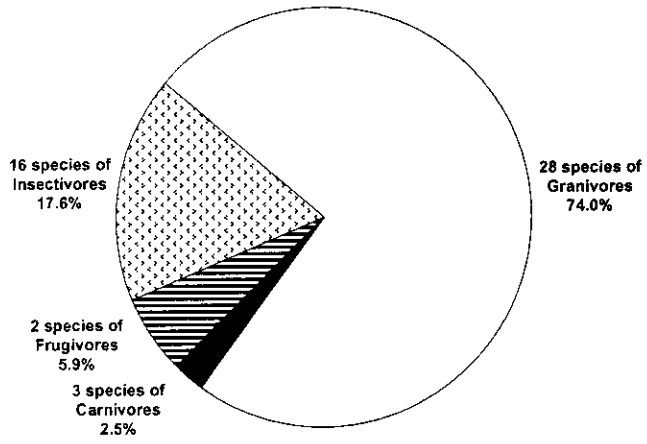

Figure 2. Bird use of sunflower fields in North Dakota in Fall 2000.

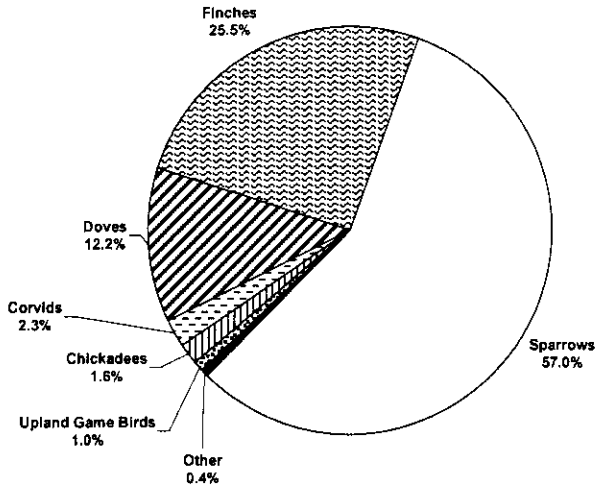

Figure 3. Non-blackbird granivorous bird use of sunflower fields in North Dakota in Fall 2000.

DISCUSSION AND MANAGEMENT IMPLICATIONS

We found 49 bird species in sunflower fields throughout late summer and early fall. Our numbers represent the minimum number of species and individuals using sunflower fields. This is particularly true for species that might have been present for brief periods during migrations.

Considering that most of the other crop fields are harvested by late August in the northern Great Plains, sunflower is the only shrub-like habitat other than scattered tree plantings and wetlands. Sunflower fields might be important habitat for summer resident birds undergoing feather replacement and premigratory fattening, transients already migrating, and winter residents migrating from more northerly locations (Hutto 1998, Petit 2000). Insects and the seeds from sunflower and weeds undoubtedly provide a rich source of food that cannot be found elsewhere. Additionally, the dense canopy of sunflower leaves provide protection from predators (Lindstrom 1990).

Avian use of harvested sunflower fields during early spring is also substantial, with 27 species identified during the first year of an ongoing study (Galle et al. 2004). Open country birds, early migrants, and winter residents were reported to be the most common birds using harvested sunflower.

Unharvested sunflower fields also might be beneficial for upland birds during fall, winter, and early spring. We observed 16 upland game birds in the sunflower but while traveling from one census point to another we saw more on the field and wetland edges. Attractiveness of sunflower fields to birds is not surprising considering that sunflower is preferred by many birds visiting backyard feeders (Geis 1980) and that over 20% of the crop is sold annually for the bird-food market (Bangsund and Leistritz 1995).

Cummings et al. (1987) paid growers to plant 9 oilseed variety sunflower fields and one interplanted corn and sunflower field (range 4 - 22 ha) over 3 years. Their small-scale study showed that decoy plantings reduced blackbird damage to commercial sunflower. Our study

and ongoing research on the use of sunflower fields during early spring support their contention that sunflower fields can provide habitat for wildlife besides blackbirds. Thus, we suggest resurrecting the idea of decoy fields (Cummings et al. 1987) for the purpose of providing safe foraging sites for blackbirds. We encourage land managers on government-owned and leased lands to consider sunflower as part of their crop rotation to provide late-season habitat for migrating birds.

We encourage expanding this idea into a formal program of Wildlife Conservation Sunflower Plots with dual purposes of reducing blackbird damage and also providing critical habitat for all animals in an otherwise barren landscape during late fall, winter, and early spring. Funding for this program could be provided by a consortium of federal, state, and private entities such agriculture and conservation groups that might benefit from this program.

Over the next 5 years, we plan to begin experimentation to 1) determine ideal plot size and plot placement, 2) assess efficacy for attracting blackbirds and reducing sunflower damage, 3) model the cost and benefits of a large scale program, and 4) compare wildlife use of sunflower fields with other crops. Initial guidelines call for 8-ha-sized plots, planted with oilseed variety sunflower, and located between traditional roost sites and the commercial crop. Use of insecticides on these plots will be discouraged.

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