

Conservation Tillage and Wildlife

Harold F. Duebbert

Wildlife biologists and administrators keep a watchful eye on changes in agricultural land use practices. They recognize that certain habitats on privately-owned farmland contribute to the maintenance of wildlife populations. While the pristine prairie grasslands were being converted to cropland over a period of years, most farmers maintained a pattern of diversified land use. A mosaic of native grass pastures, tame hayfields, growing grain or stubble, wetlands, and odd areas of undisturbed cover provided habitats suitable for diverse populations of wildlife.

Relatively few North Dakota farms are now managed as diversified operations. Instead, vast acreages of small grain monocultures have become prevalent over much of the state's cropped area. Intensive annual tillage of cropland is exploitive of soil resources, degrades the quality of wetlands, and leaves little habitat for wildlife. Thus, wildlife managers are pleased about the current trend toward increased use of certain soil-conserving farming practices.

One specialized form of conservation tillage now being practiced in the Great Plains is the production of no-till winter wheat. Planting no-till winter wheat requires only one mechanical operation annually since the seeds are planted into stubble residue of the previous year's crop. The best practice in northern latitudes is to plant directly into upright stubble in the fall in order to trap snow for protection from extremely cold temperatures.

Waterfowl biologists recognized that no-till winter wheat appeared to have good potential as nesting habitat for ground-nesting ducks and other birds (Figure 1). It provides attractive and relatively undisturbed stubble nest cover early in the season and stubble combined with growing wheat later on. Nesting birds have adequate time to lay their eggs and complete incubation of them without being disturbed by farming machinery. Laying and incubation of a set of duck eggs usually requires about 30-35 days (Figure 2).

Biologists at the U.S. Fish and Wildlife Service's Northern Prairie Wildlife Research Center in Jamestown studied duck nesting in fields of no-till winter wheat at several locations in the prairie pothole region of North Dakota. The objective of the study conducted during 1984 and 1985 was to evaluate the amount of nesting and reproductive success of ducks in no-till winter wheat. Fields were selected for study in 10 North Dakota counties scattered across the state from southeast to northwest. Names of no-till winter wheat producers were obtained from the Soil Conservation Service and selected operators were contacted. The study was

made possible by the voluntary cooperation of 43 farm operators. From discussions with these people, it was apparent that many North Dakota farmers are concerned about proper soil stewardship and have a concern for wildlife.



Figure 1. Duck nesting cover provided by no-till winter wheat in Stutsman County, June 1.



Figure 2. Hatching pintail eggs in no-till winter wheat indicated the site was undisturbed for 32 days.

Duebbert is with U.S. Fish and Wildlife Service, Northern Prairie Wildlife Research Center, Jamestown, North Dakota 58402.

Areas selected for study contained good quality wetland complexes to support breeding waterfowl and generally represented the diversity of habitat conditions found in the prairie pothole region. Water conditions varied from extremely wet to extremely dry among areas and years. Duck populations varied in relation to the local wetland conditions. Upland-nesting duck species in proximity to study sites included green-winged teal, mallard, gadwall, northern pintail, blue-winged teal, northern shoveler, and American wigeon.

One or two searches for duck nests were conducted on 129 fields totaling 5700 acres during the two years. One hundred and fifty-one nests were found of five of the seven resident species of upland-nesting ducks. Blue-winged teal nests made up 36 percent of the total; northern pintail (29 percent), mallard (19 percent), gadwall (10 percent), and northern shoveler (5 percent) accounted for the remainder. The average number of duck nests found per 100 acres was 3.2 in 1984 and 2.4 in 1985, or 2.8 for both years.

The earliest-nesting pintail hens began laying eggs in late April when the fields had primarily a stubble aspect. In 1984, 12 of 20 pintail nests were initiated on or before May 2. In 1985, eight of 22 pintail nests were started before May 2. In contrast, fewer mallards (another early-nesting species) used no-till winter wheat for early nesting. For both years combined, only four of 31 mallard nests were initiated before May 2. Pintails and mallards used no-till winter wheat for re-nesting with nest initiations occurring throughout May and June. The majority of blue-winged teal hens began nesting after mid-May when the green wheat had attained a height of 12 inches or more.

Hatching success for all species combined averaged 26 percent in 1984 and 29 percent in 1985. The principal cause of nest destruction was mammalian predation which accounted for 70-75 percent of the nest losses. It was inferred that red foxes, Franklin's ground squirrels, and striped skunks were major predators. We did not detect any adverse effects from herbicides or fungicides on either nesting hens or eggs.

We found 29 nests of seven other species of ground-nesting birds: Wilson's phalarope, upland sandpiper, willet, gray partridge, mourning dove, marbled godwit, and killdeer. No sharp-tailed grouse or ring-necked pheasant nests were found although females of these species were observed during the nesting period. Several farmers reported a noticeable increase in numbers of partridges after having no-till winter wheat on their land.

Results of this study indicated that fields of no-till winter wheat provide acceptable nesting habitat for five species of ducks and at least seven other species of birds. For the two years combined, the number of duck nests averaged about 2.8 per 100 acres and 27 percent of the nests produced young. Although the nest density was low in comparison to other habitats used by ducks, the hatch rate was adequate to produce birds above the level of population maintenance. Also, the large total acreage of no-till winter wheat within the prairie pothole region (a major breeding area for ducks in North America) could provide several million acres of nesting habitat.

The amount of winter wheat planted in North Dakota had increased to about 500,000 acres by 1985. Similar increases also have occurred in other important duck breeding areas in neighboring states and provinces. At present, there is considerable evidence that increasing energy costs and concerns of society about soil erosion may provide incentives for soil conserving methods of crop production. A recent estimate by the U.S. Department of Agriculture projected that by the year 2000 crop production will be about 80 percent by minimum tillage and 50 percent by no-till.

Based on available information, it appears that the trend toward increased no-till winter wheat should have a positive impact on production of upland-nesting ducks and some other birds. Two species in particular, mallard and pintail, that have recently experienced population declines could be benefited by increased availability of suitable nesting habitat. It is encouraging that maintenance of adequate wildlife populations in the future could be influenced by production of some species as a by-product of agriculture on private lands.