INTRODUCTION
Increased concentrations of greater sandhill cranes (Grus canadensis tabida) in agriculture areas have led to the problem of crop damage in Wisconsin. Crop damage by sandhill cranes is intermittent and influenced by certain geographic areas, crop types, and times of the year. Crane damage complaints from growers compiled by the Wisconsin Department of Natural Resources and the U.S. Department of Agriculture reveal that agricultural damage is correlated to geographic regions that have high densities of cranes, specifically the central and southeast regions of Wisconsin.

Since 1991, ICF’s research on sandhill cranes has determined that in Wisconsin corn and potato fields receive the most damage from cranes. In addition, both territorial and non-territorial birds can cause damage but the predictability and extent of damage differs markedly between birds in these two social groups. Using techniques first developed by local farmers, ICF tested the efficacy of Lindane (an insecticide) from 1996-1999 to reduce crane damage to newly emerging corn. In addition, in 1998-1999 ICF began investigating the conditions surrounding crane damage to potato fields.

POTATO RESEARCH
Resource selection by sandhill cranes was monitored in 1998-1999 to determine the conditions surrounding use of potatoes by cranes and subsequent damage. Cranes exhibited a distinct shift in habitat use throughout both growing seasons. For example, when corn and soybean fields become unavailable due to vegetation height, cranes select for more readily accessible resources such as potato and mint fields. Research has indicated that in the early stages of the growing season, cranes ingest developing potatoes as a food source. Later in the growing season, cranes cause damage to maturing potatoes through both exposure and physical damage. Greater than 50% of damage occurs because potatoes rot after being exposed by cranes. Two theories for why cranes damage mature potatoes are that cranes are foraging for underdeveloped potatoes growing amid the mature ones and/or cranes are foraging for invertebrates below the soil. Both breeding and nonbreeding cranes forage in potato fields and both social groups are responsible for damage. However, damage does not occur in every instance that cranes occupy potato fields. Potato fields provide an ample and diverse supply of natural foods and are additionally used to rest, socialize, and perform self-maintenance behaviors.

Preliminary information from Wisconsin potato growers gathered through personal contact and the Wisconsin Potato and Vegetable Growers Association indicate that there is a correlation between potato damage and crane density in the state. This relationship is similar to that found with corn damage. Landowners and agricultural
scientists have additionally supplied information indicating that when damage occurs and the form damage takes are similar to the results obtained from research conducted by ICF.

EXPERIMENTAL USE OF LINDANE
In 1999, assessments of crop damage within cornfields and the effectiveness of Lindane as a deterrent were conducted. Within the research area approximately half of the cornfields were treated with Lindane. Breeding and nonbreeding cranes foraged in both treated and untreated cornfields during germination. No damage occurred in treated fields. Further research was conducted to determine an index for damage to corn seedlings in treated and untreated fields and to determine the geographic locations of corn damage in relation to landscape features (i.e. wetlands, etc.). This technique allows us to quantitatively assess the effectiveness of repellents.

FUTURE RESEARCH OBJECTIVES
A solution for crop damage that allows sandhill cranes access to, but not damage, crop fields changes a problem into a positive relationship. Sandhill cranes can help growers by removing waste grains from fields before subsequent plantings and by foraging on invertebrate species that may otherwise be harmful to crops. Traditional management techniques like pyrotechnics, cannons, or dogs simply relocate cranes to adjacent growers and therefore push problems of crop damage off on to others. Scare tactics are rarely effective for long because cranes can quickly habituate to them. With Lindane we have identified a process that works.

The next objective of ICF’s efforts with alleviating crane damage to sprouting corn is to find an alternative chemical deterrent that is as effective, but more environmentally benign, than Lindane. Any new substance must also be widely available, easy to apply, usable with corn planting machinery, and inexpensive. In fall 1998, ICF supported a study, conducted by the USDA/National Wildlife Research Center’s Sandusky, Ohio Field Station in cooperation with Patuxent Wildlife Research Center (PWRC), to find an alternative to lindane. Flight Control TM (whose active ingredient is anthraquinone) was proven to be an effective deterrent on captive sandhill cranes. We hope field trials to test the efficacy of Flight Control TM will be conducted in spring 2000.

While the application of a chemical deterrent to corn is a relatively simple process, possible solutions to prevent damage to potatoes are more complicated. Unlike corn, potatoes are grown below ground and therefore cannot be treated directly. In addition, damage to potatoes occurs over a greater period of time. A chemical deterrent applied at planting will lose its efficacy before damage may occur in mid-summer. Further research in 2000 will include experimenting with possible solutions to prevent damage to potato resources and to continue surveying the resource use of breeding and nonbreeding cranes in potato production areas where other varieties of potatoes are grown in different soil types. Additional research will yield the information needed to predict future occurrences of potato damage and establish appropriate management responses to preserve both the ecological integrity of the greater sandhill crane population and Wisconsin’s agricultural community and resources.