OVERHEAD GRIDLINE SYSTEMS TO EXCLUDE WATERFOWL FROM LARGE BODIES OF WATER

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Abstract: The presence of birds at retention/detention basins on or adjacent to an airport increases the probability of experiencing a wildlife strike. Overhead gridline systems have proven effective for reducing the presence of birds on small water bodies. While there are several line materials available to address bird hazards associated with small basins, the list of options decreases quickly as the distance to be spanned increases. The Michigan Wildlife Services program (WS) tested 4 types of line material on 3 large detention basins to determine which materials could span up to 675 m (2214.5 ft) without center supports. Additionally, the line material could not sag substantially because of water fluctuations of up to 1.5 m (5 ft). If a line would contact the surface of the water, the surface tension would hold it in place reducing the effectiveness and causing potential damage to the grid, especially during freezing and thawing periods. We found that a braided fishing line made of Spectra® fiber called PowerPro proved superior in our tests. We suspended grid lines in perpendicular directions on 30 m (100 ft) spacing. Preliminary results show a notable reduction in usage by Canada geese (*Branta canadensis*), mallards (*Anas platyrhynchos*), mute swans (*Cygnus olor*), herring gulls (*Larus argentatus*) and ring-billed gulls (*Larus delawarensis*).

Key words: airport, bird strike, exclusion, gridlines, hazardous wildlife, overhead lines, PowerPro, waterfowl

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INTRODUCTION

Wildlife strikes at airports and military bases are a serious economic and safety problem. Cleary et al. (2002) estimated wildlife strikes cost the civil aviation industry in the USA over $400 million/year from 1990-2001. At least 138 people have died worldwide as a result of bird strikes from 1990-2002 (Thorpe 1996, 1998, Richardson & West 2000).

The majority of bird strikes occur below 152.4 m (500 ft) above ground level during takeoff and landing (Cleary et al. 2002). The presence of retention/detention basins on or adjacent to an airport attracts a variety of bird species, which increases the probability of experiencing a wildlife strike. Wetland mitigation, storm water collection, and aesthetics are all reasons for ponds being created on or adjacent to airports or military bases. These ponds provide habitat for waterfowl, gulls, and wading birds, all of which represent threats to aviation safety (Dolbeer et al. 2000).

Overhead gridline systems have proven effective for reducing the presence of birds on small water bodies (<15 ha; Fairaizl 1992, Lowney 1993). While there are several grid materials available to address bird hazards associated with small basins, the list of options decreases quickly as the distance to be spanned increases. This paper details our account in testing overhead grid line materials on a 16 ha detention basin, where the longest span is approximately 675 meters.

BACKGROUND

In December 1999, Wayne County Detroit Metropolitan Airport (DTW) entered into an agreement with Wildlife Services (WS) to provide a Wildlife Hazard Assessment (WHA). During the assessment process, we identified 4 on-site detention basins as significant wildlife attractants. Three of the ponds are adjacent to movement areas and the fourth pond is on airport property but outside of the perimeter fence. These ponds were constructed to capture runoff from the paved surfaces and to aid in the collection of glycol from de-icing applications. The approximate sizes of the ponds are as follows: Pond 003W = 9 ha (22 ac), Pond 003E = 16 ha (38 ac), Pond 004 =16 ha (38 ac), Pond 006 = 32 ha (80 ac). During the assessment period, bird activity on Ponds 003E, 004 and 006 was very similar. Pond 003W, however, did not receive as much bird pressure. We believe this is due to greater levels of glycol in Pond 003W. Figure 1 shows average numbers of birds using the pond area by month during our assessment.

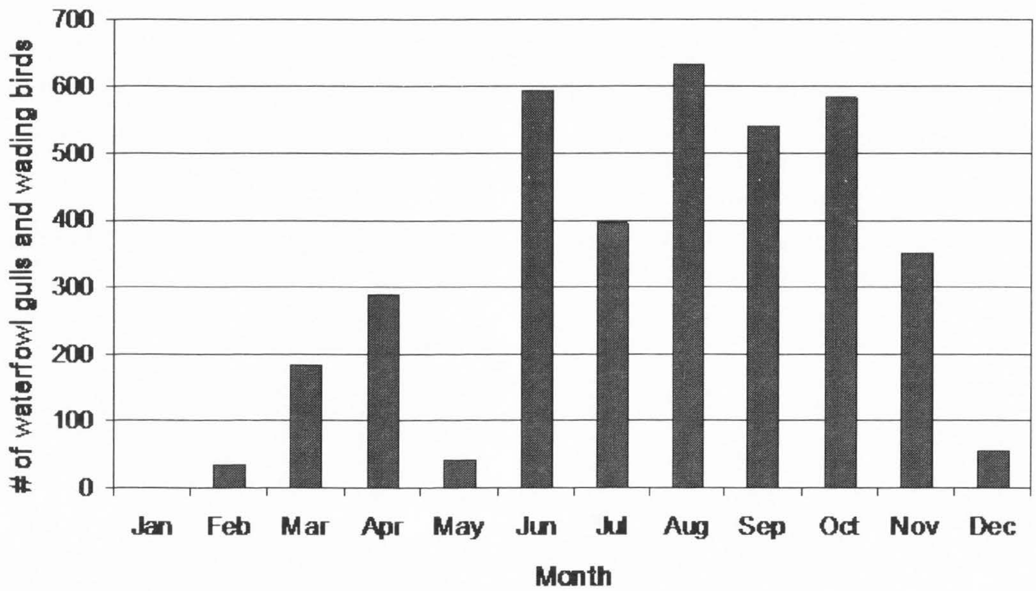

Figure 1. Average number of waterfowl, gulls and wading birds observed per survey in and around the ponds at DTW during our Wildlife Hazard Assessment 2000-2001.

Upon completion of the WHA in 2001, DTW and WS implemented an intensive non-lethal harassment program to reduce usage of the ponds by waterfowl, gulls, and wading birds. In addition, we employed limited lethal shooting to reinforce the non-lethal harassment. Because of the proximity of the ponds to aircraft movement areas and public roads, we were limited as to which methods could be employed safely. Furthermore, lethal shooting was restricted by DTW to certain sections of the ponds due to safety concerns. The result was a slight reduction in overall bird usage. In 2003, WS proposed to test a system of overhead grid lines on the largest of the 3 on-site ponds (Pond 004) to further reduce the presence of birds.

MATERIALS AND METHODS

We conducted 2 tests, the first determined which materials could span up to 675 m without center supports. We could not place supports in the ponds because the water freezes during the winter months, and shifting ice would damage the support posts/grid line system. Additionally, the water levels fluctuate up to 1.5 m so the line material could not sag substantially. If a line would come in contact with the water, surface tension would hold it in place, reducing the effectiveness and causing potential damage to the grid, especially during freezing and thawing periods.

Our second test was to determine the effectiveness of lines spaced at 30 m (100 ft) intervals in repelling waterfowl, gull and wading bird species from the ponds.

We tested 4 types of materials including 12 and 15 gauge black polypropylene line (National Netting, Norcross, GA), 12 gauge high-tensile fence wire (Tractor Supply Co.), 13.6 kg (30 lb) test monofilament fishing line (Stren), and 113.6 kg (250 lb) test braided fishing line (PowerPro). The tests consisted of suspending line materials between 2.4 m (8 ft) steel T-Post fence posts pounded at least 1 m (3.5 ft) into the pond berm. The distance between posts varied from approximately 30 m to 675 m. We connected the line materials to the T-posts using high-tensile fence strainers.

Once the material tests were completed, we planned to install an overhead line system above Pond 004 using a spacing of 30 m between parallel lines and 30 m between the perpendicular overlapping lines. The 30 m spacing was simply a starting point and we planned to add lines as necessary to exclude different species.

The mention of products and corporations does not constitute an endorsement by the U.S. Department of Agriculture.

RESULTS

We conducted initial tests using polypropylene lines. The manufacturer recommended the pond be divided into five sections, using the larger 12 gauge line as a support structure. We tied loops into the support line every 30 m and attached the 15 gauge line to the loops using simple overhand knots. We quickly abandoned this strategy as the 12 gauge support lines were not strong enough to span distances in excess of 100 m without center supports. The polypropylene line stretched excessively and eventually broke as we repeatedly tightened the strainers. We proceeded to try the lighter 15 gauge line, but had similar results on the longer spans.

We then tested the monofilament line and the high-tensile wire. Again, the monofilament line stretched and eventually broke similarly to the polypropylene line. The high-tensile wire, when suspended between T-posts 100 m apart, proved too heavy for the T-posts to support. The posts bent almost 90° under the weight of the wire. We replaced the T-posts with 4 x 8 inch treated landscaping timbers. We attached the wire using high-tensile fence strainers as before. This time, as we tensioned the wire, the weight of the material itself caused the wire to pull thin in several locations, eventually breaking.

Our last material tested was the braided fishing line from PowerPro. We began by connecting the first line between T-posts that were approximately 100 m apart using fence strainers as before. The PowerPro showed little sign of stretching as we tensioned the line. In fact, we were able to tension the line sufficiently to eliminate all sag without breaking the lines, even over the longest spans. In addition, the weight of the line was not excessive enough to bend the support posts as with the high tensile wire. We continued to complete the overhead line grid system using the PowerPro line above Pond 004 in May 2004. The grid consisted of parallel lines spaced at intervals of approximately 30 m with overlapping perpendicular lines at the same spacing. We had observed waterfowl and gulls shying away from the pond during installation of the lines, but we attributed most of that to our presence at the site. However, once the grid was complete, DTW reported dramatically less usage by waterfowl and gulls (Figure 2).

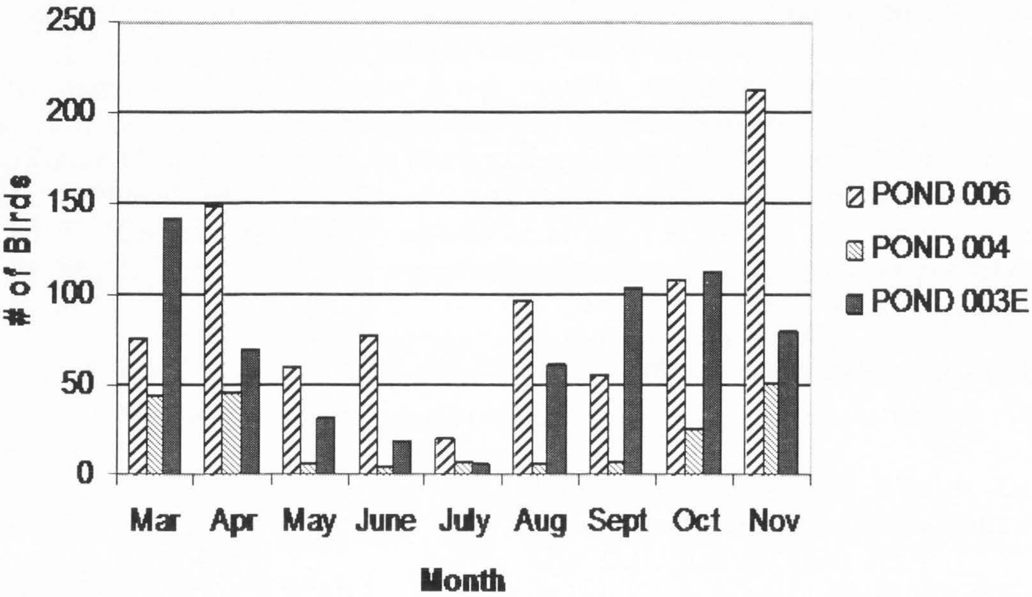

Figure 2. Average number of waterfowl, gulls, wading birds observed on Ponds 003E, 004 and 006 by month. Overhead grid was operational in May of 2004.

DISCUSSION AND CONCLUSIONS

We continued in our effort to reduce wildlife strikes by installing the grids over Ponds 003E and 003W in 2005. Routine maintenance has proven necessary each spring to replace worn or damaged lines and fence strainers. It is important to point out that the grid lines at DTW are part of an integrated wildlife damage management program consisting of many non-lethal harassment techniques reinforced with limited lethal shooting. In addition, DTW releases as much water from the ponds as state/federal permits will allow, minimizing the amount of water present.

Initial results indicate that the grids repel most waterfowl, gull and wading bird species, at least initially. Although wading birds did quickly learn to navigate between the lines, the majority of large flocking birds (Canada geese (*Branta canadensis*), ring-billed gulls (*Larus delawarensis*), herring gulls (*Larus argentatus*), mallards (*Anas platyrhynchos*), and mute swans (*Cygnus olor*)) continue to be repelled. It is difficult to say conclusively that the overhead line systems would work as well in the absence of other control methods.

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