Using Zena™ Prototypes as Perching Deterrents on Airfield Signage

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Abstract

Airfields often provide very attractive habitat for many avian species, including a variety of raptor species. Avian wildlife at the Portland International Airport (PDX) poses the greatest wildlife strike risk to aircraft. More specifically, raptors at PDX are designated as "very high" for both the probability of a strike occurrence and the potential for extreme damage [Ref. 2004 PDX WHMP risk assessment based on model by Dr. J R Allan of the United Kingdom]. As such, raptors are the focus of much of the management efforts on this airfield. One of the biggest concerns for wildlife managers on the PDX airfield is the perching of large raptors, specifically red-tailed hawks (*Buteo jamaicensis*), on airfield signage within the runway safety areas (RSA). Airfield signage creates perfect hunting perches throughout the grass infields of many airfields around the world due to the structure and the perching platforms they create. Many types of anti-perching materials available commercially have been tried on airfield signs in the past with little or no negative impacts to the birds. However, data collected during a field trial of a product from the Zena Design Group shows promise in deterring perching by red-tailed hawks at PDX.

1. Introduction

PDX is located at the intersection of two major corridors for North American migratory bird species. The Pacific Flyway is a north-south route used extensively by migrating species including red-tailed hawks. The Columbia River corridor intersects with the Pacific Flyway, facilitating movement on an east–west axis for both migratory and resident species. Because of the combination of the airfield's location within an extensively developed metropolitan area and the fact that it is located at the junction of these two migratory corridors, raptors, specifically red-tailed hawks, are a significant management concern at PDX.

The airfield is comprised of 1,735 acres of primarily wide open grassland created by the infield areas. This provides habitat for an abundance of prey species in the form of voles, which further contributes to the attractiveness of PDX for both transient and resident red-tailed hawks.

Nationally, raptor species account for 13% of the annual strikes with aircraft, according to FAA data compiled between 1990 and 2005 (Cleary, Dolbeer &

Wright 2006). Between the years of 2000 and 2005 raptor species accounted for 46% of the strikes at PDX. Red-tailed hawks alone accounted for 16% of the strikes during this same time period (Port of Portland 2000-2005). As these numbers show, raptors are a significant management issue for the Wildlife Management program at PDX. Along with various ongoing small mammal control management efforts, PDX has continually searched for effective devices to deter raptors from perching on a variety of airfield structures.

In 2002 the Wildlife Hazard Management Program at PDX was put in contact with a company called Zena Design Group that was looking into the development of anti-perching materials for use in an airfield environment. This company had already developed a successful anti-perching device used by power companies in Florida to deter roosting and perching of turkey vultures. Wildlife staff at PDX agreed that if Zena Design Group developed the necessary prototypes, a field trial would be carried out at PDX to try to determine whether the anti-perching devices would deter the perching of raptors on airfield infrastructure with as much success as similar devices had deterred turkey vultures from perching and roosting on power line infrastructure.

Working together with Port of Portland electricians, maintenance, airfield operations and wildlife staff, Zena Design Group created a set of perching deterrent prototypes for use in this field trial. Initially, only five prototypes of the single row configuration were sent to get the trial underway. Later, two additional prototypes, these of the double row configuration, were sent so that there were enough to install the product on all seven distance-to-go (DTG) signs in the project area. The original configuration consisted of a single row of larger cones on a base that fit over the top of the DTG sign. The final two prototypes delivered consisted of two rows of cones on a similar base. [See Figure 1]

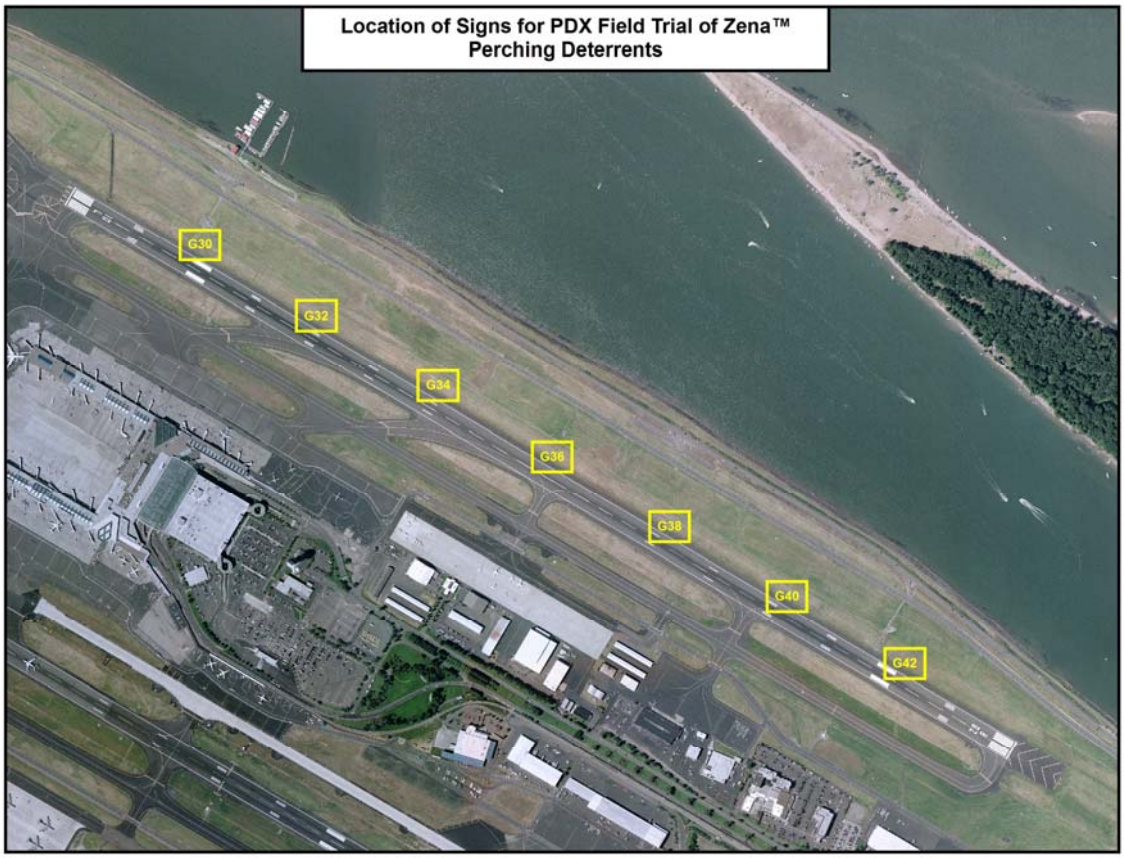
Figure 1:

Zena™ Single Row Configuration Zena™ Double Row Configuration

2. Methods

In determining how to design a field trial for Zena™ perching deterrents, Richard Dolbeer, the chair of Bird Strike Committee USA and a member of the USDA National Wildlife Research Center, was consulted and remained very involved with the development of the testing strategy. In discussions with Mr. Dolbeer it was decided that the best way to test this product on the PDX airfield was to first choose an area with high hawk activity and to then perform the test in stages. The area chosen for the field test is the series of DTG signs along the north side of the north runway [See Figure 2]. These signs were chosen for the test based on three major factors. First, historical data showed a high level of perching activity on these signs by red-tailed hawks. Next, limited access and the proximity of the runway in this area make hazing a challenge. Lastly, these signs are very visible and therefore easy to monitor.

Figure 2: Location of Distance-To-Go Signs



The approach taken during this field trial was to perform the data collection in stages to get a more complete understanding of the birds' reactions to the devices. Originally, it was suggested that there be three stages during the trial. The first stage would be 3 months of data gathering during the "Pre-treatment" stage prior to installation of any perching deterrents. This would be followed by two implementation phases. During "Phase 1" of implementation, a Zena™ perching deterrent was attached to four of the seven signs. Data on bird presence and behavior was collected for another 3 months. Then, during "Phase 2", the device was attached to the remaining three signs and presence and behavior was monitored for another 3 months. Initially, the plan was that the test would be complete after this stage.

However, due to issues with producing the prototypes, perching deterrents of two different designs, single row and double row configurations, were installed. The double row prototype configuration was introduced during the "Phase 2" portion of the trial. What we noticed during "Phase 2" of data collection was a heightened level of discouragement toward one style of perching deterrent over the other. So, to verify observations, a third implementation phase of

observations was completed. This portion of the trial, “Phase 3”, consisted of moving the double row prototype configuration to signs that had previously shown higher activity levels than the others to confirm a heightened negative response. For comparison purposes, 3 months of data after “Phase 3” with no prototypes installed was also added to figures as “Post-Treatment” information.

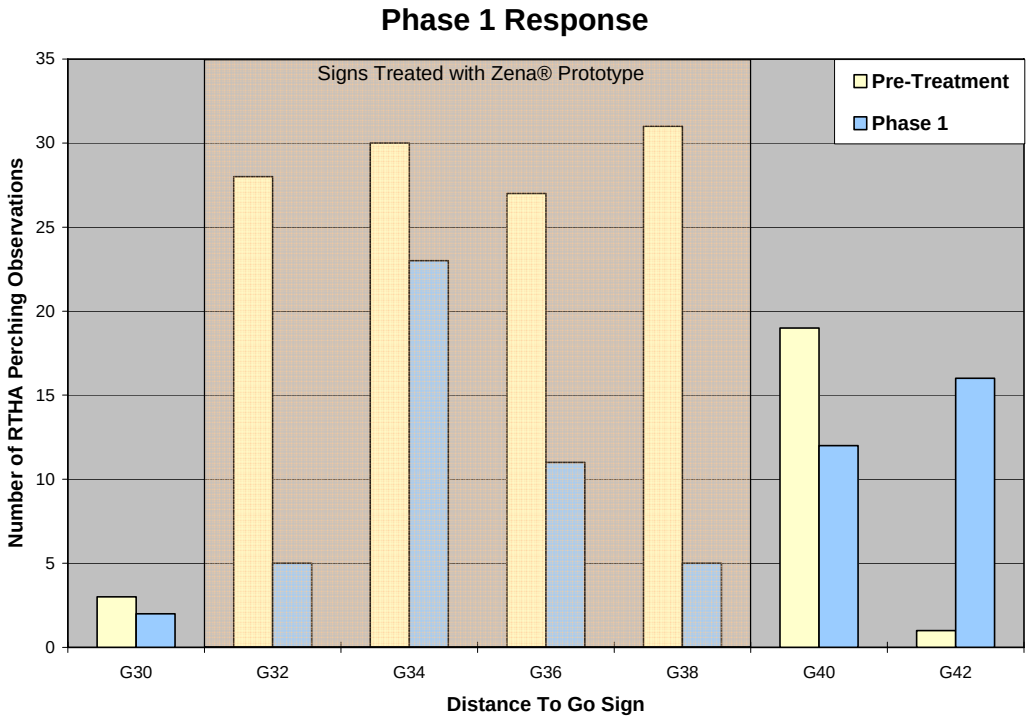
3. Results

When doing a field trial in an uncontrolled environment there are many variables that constantly effect wildlife behavior. A few such variables include weather, seasonality, territoriality of resident birds, etc. Despite these variables, there was still a visible reaction to the Zena™ prototypes measured throughout this trial. When the deterrents were first introduced, there were observations of local birds attempting to land on a known perch, a DTG sign, and then not landing. We can only speculate that this was caused by an initial visual trigger. Next, it was observed that these same local birds would attempt to land on the prototypes, and then would get uncomfortable or frustrated and find another perch. Eventually, these birds learned how to perch on the prototypes, but when approached would leave the perch much sooner than a more comfortable perch. This led us to believe that even though the birds had acclimated to the prototypes, they were still uncomfortable perching on them. This effect seemed more defined on transient birds then on resident birds at PDX.

3.1 Phase 1

Phase 1 was the first phase of the trial following the 3 months of data collection prior to initiation of the trial. During this 3 month phase Zena™ perching deterrent prototypes were affixed to four of the seven DTG signs along the north runway of PDX. Data from the Pre-Treatment Phase was studied and the signs that had the most perching activity documented were the signs that were selected for treatment. This ended up being four of the signs in the center of the length of the runway. During the trial, a reduction in perching was noted on all of the treated signs. A significant reduction in perching was noted on three of the four treated signs. The treatment of these center signs also appeared to push perching activity to one sign that was previously unused. Figure 3 shows a visual illustration of the response during Phase 1 as compared with Pre-Treatment data. The alpha-numeric code listed along the bottom of the following charts represents the location of each distance to go sign on a grid system used to collect data on the airfield at PDX.

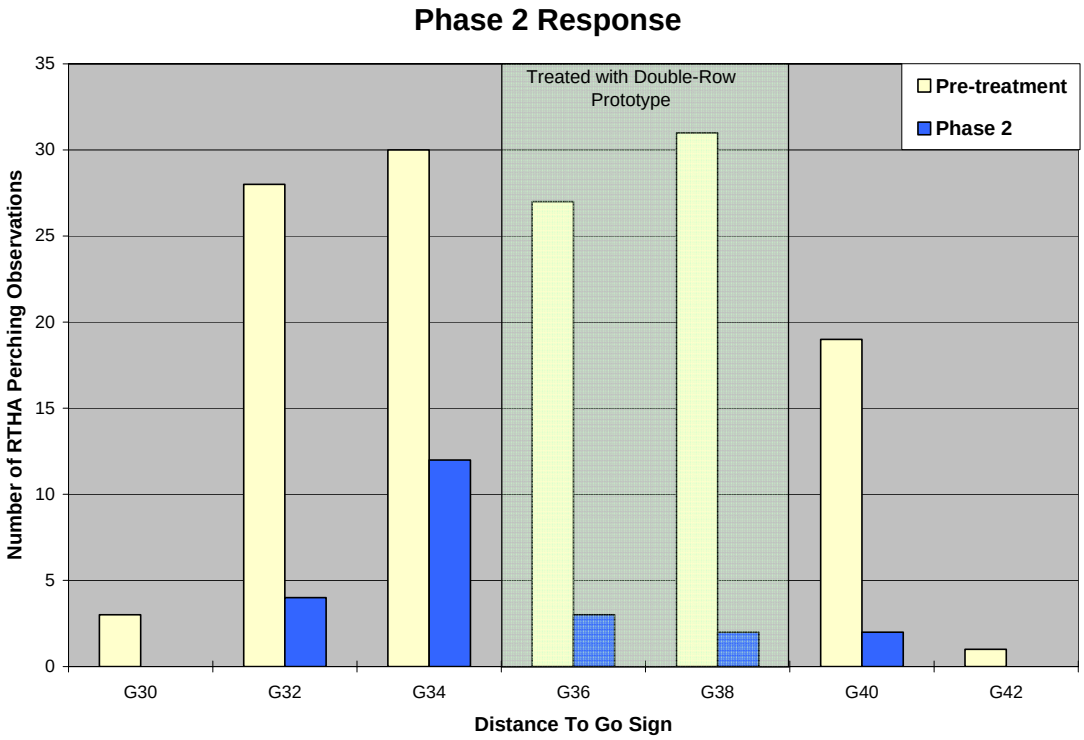
Figure 3:



3.2 Phase 2

During Phase 2 of the trial the remaining three Zena™ perching deterrent prototypes were installed. It should be noted that at this time, two of the three prototypes installed were of a different configuration than those introduced in Phase 1. The two different prototypes were the double row configuration. They were placed on two signs toward the center of the project area. These signs were selected because the prototypes fit best on these signs. This moved the original single row prototypes to the signs on either end of the project area. Observations were taken for 3 months. During this phase of the trial, there was a significant reduction in perching throughout the project area on all treated signs. However, it was also observed that the most significant reduction in perching was documented on the signs treated with the double row configuration Zena™ prototype. This led to the decision to add a third phase in the trial to determine if there was indeed a more negative response to the double row prototype. Figure 4 shows a visual illustration of the response during Phase 2 of the trial.

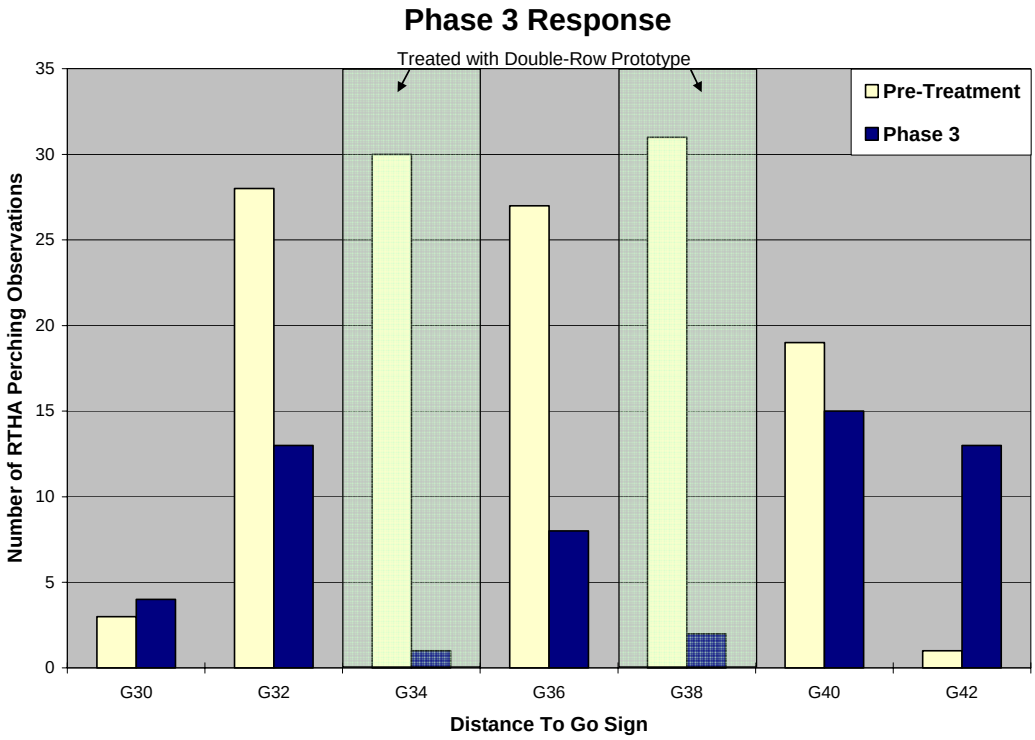
Figure 4:



3.3 Phase 3

During Phase 3 of the trial, the double row Zena™ prototype was placed on the two signs on which the most perching observations were documented during the Pre-Treatment Phase. The purpose of this portion of the trial was to confirm observations from Phase 2 - that the double row prototypes had a greater deterrent affect on red-tailed hawks than the single row prototypes. Due to the reasoning behind the placement of the double row prototypes, one remained on the G38 sign as it had been on during the previous phase, while one moved to the G34 sign. All other signs remained treated with single row prototypes. Observations were documented for 3 months during this phase. As hypothesized, the double row prototypes had a dramatically significant effect on perching on the G34 sign, which was newly treated. The G38 sign, which remained treated with the double row prototype, remained at the same low level of activity. Figure 5 shows a visual illustration of the response during Phase 3 of the trial.

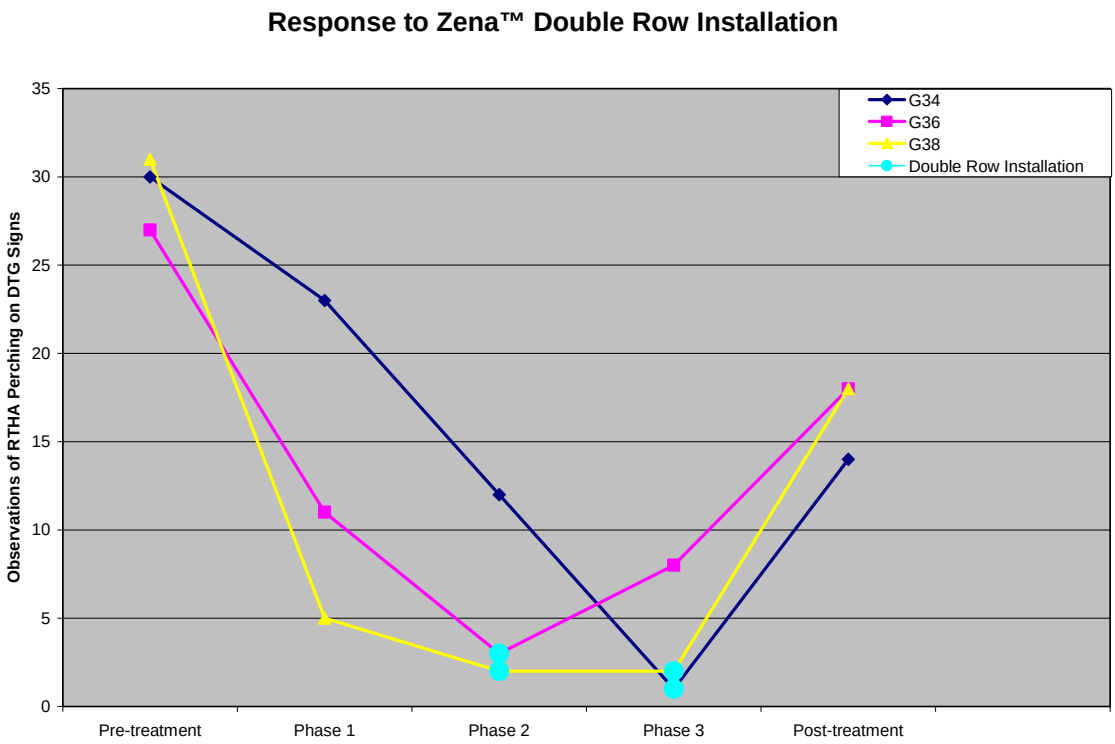
Figure 5:



4. Conclusions

After preliminary review of data collected, the deterrent effect of the Zena™ anti-perching prototypes is evident. In general, during the trial period the average decrease in perching on signs treated with Zena™ prototypes was 64% as compared to pre-treatment data. The greatest reduction in perching on any single sign throughout one phase of the project was 97%. After realizing this number was much higher than the average, it was hypothesized that it was perhaps due to the fact that the Zena™ prototype showing this response was of a different configuration than the others. Consequently, another phase of the study was designed and performed to test whether or not the configuration itself was a factor. During this phase of the trial the alternate configuration proved to be superior by deterring perching an average of 86% of the time. This is in comparison to an average decrease of 56% in perching on the original configuration Zena™ prototype. Figure 6 shows the increased negative response to the double row prototype on the three signs treated in phases 2 and 3 of the trial. Recall that any other responses during phase 1-3 are due to treatment with the original single row configuration as these three signs were treated during all phases of the trial. Note also that the alpha-numeric codes represent individual distance to go signs.

Figure 6:



The perching deterrent prototypes created by the Zena Design Group show great potential in deterring the perching of large raptors on airfield signage. It was determined through the trial at PDX that the smaller cone size on the double row configuration was more successful than the larger cones of the single row configuration. This appeared to be due to the fact that the smaller cones were harder for the birds to adapt to. More research effort should be made to look into the feasibility of treating different airfield signage configurations with Zena™ prototypes.

5. Acknowledgements

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Mr. Mark Taylor, FAA Airport Certification Inspector
Port of Portland Wildlife Staff
Port of Portland Airfield Operations Staff

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