Efficacy of an Acoustic Hailing Device as an Avian Dispersal Tool

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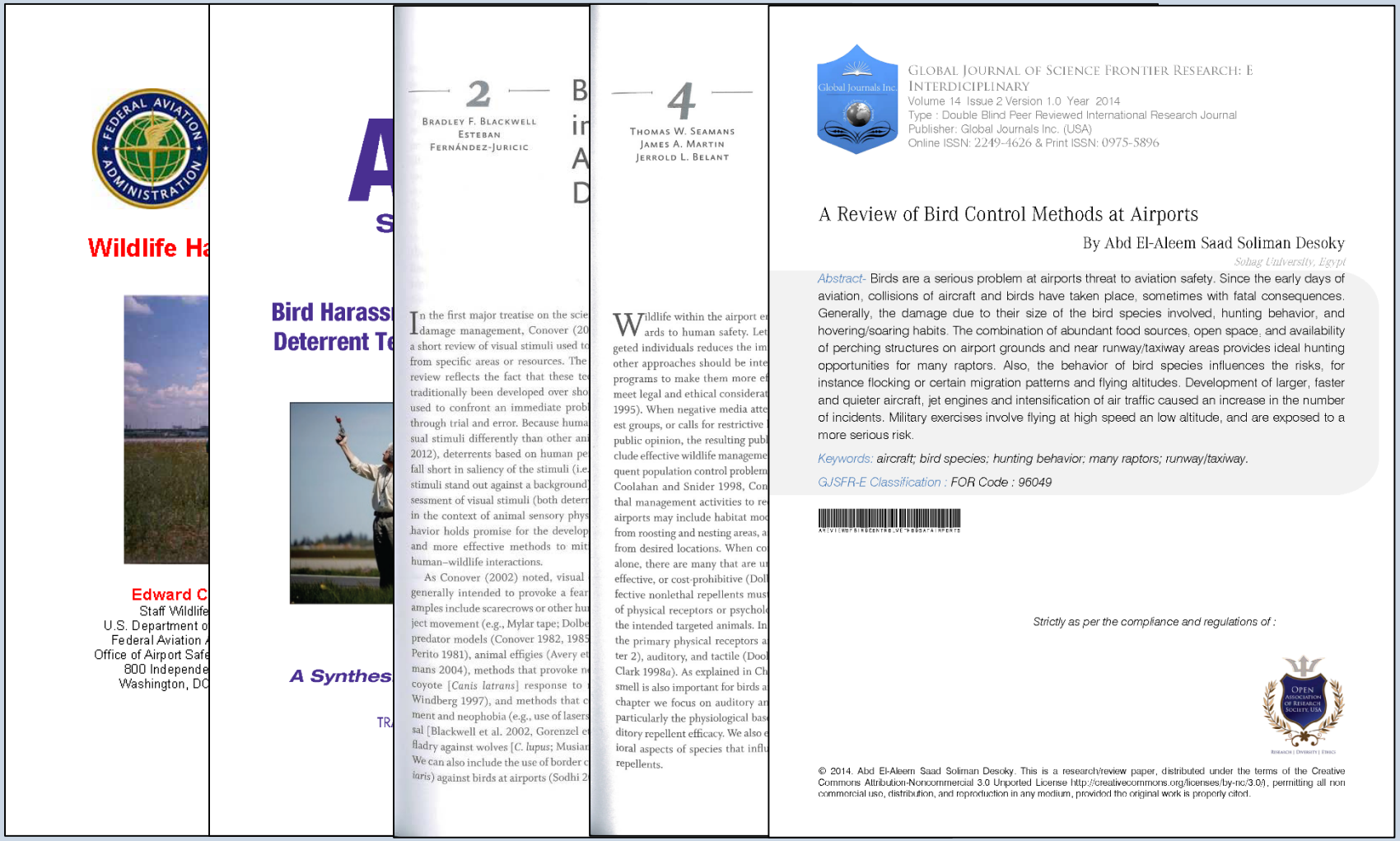
Outline

- Background
  - Hazing birds
  - Bird auditory capabilities
  - Acoustic Hailing Devices (AHDs)
- Study location, field methods, analyses
- Results by species group
- Conclusions
- Future research

Hazing birds—what are the options?



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Bird Harass
Deterrent Te

A Synthes

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In the first major treatise on the scie
damage management, Conover (20
a short review of visual stimuli used to
from specific areas or resources. The
review reflects the fact that these te
traditionally been developed over sho
used to confront an immediate prob
through trial and error. Because huma
sual stimuli differently than other an
2012), deterrents based on human pe
fall short in saliency of the stimuli (i.e.
stimuli stand out against a background
sessment of visual stimuli (both deterr
in the context of animal sensory phys
havior holds promise for the develop
and more effective methods to mit
human–wildlife interactions.

As Conover (2002) noted, visual
generally intended to provoke a fear
amples include scarecrows or other hu
ject movement (e.g., Mylar tape; Dolbe
predator models (Conover 1982, 1985
Perito 1981), animal effigies (Avery et
mans 2004), methods that provoke n
coyote [*Canis latrans*] response to
Windberg 1997), and methods that c
ment and neophobia (e.g., use of lasers
sal [Blackwell et al. 2002, Gorenzel et
fladry against wolves [*C. lupus*; Musian
We can also include the use of border c
iaris) against birds at airports (Sodhi 2

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Thomas W. Seamans
James A. Martin
Jerrold L. Belant

Wildlife within the airport e
ards to human safety. Let
geted individuals reduces the im
other approaches should be inte
programs to make them more ef
meet legal and ethical considerat
1995). When negative media atte
est groups, or calls for restrictive
public opinion, the resulting publ
clude effective wildlife manageme
quent population control problem
Coolahan and Snider 1998, Con
thal management activities to re
airports may include habitat mo
from roosting and nesting areas, a
from desired locations. When co
alone, there are many that are u
effective, or cost-prohibitive (Dol
fective nonlethal repellents mus
of physical receptors or psychol
the intended targeted animals. In
the primary physical receptors a
ter 2), auditory, and tactile (Dool
Clark 1998*a*). As explained in Ch
smell is also important for birds a
chapter we focus on auditory an
particularly the physiological bas
ditory repellent efficacy. We also e
ioral aspects of species that influ
repellents.

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A Review of Bird Control Methods at Airports

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Abstract- Birds are a serious problem at airports threat to aviation safety. Since the early days of aviation, collisions of aircraft and birds have taken place, sometimes with fatal consequences. Generally, the damage due to their size of the bird species involved, hunting behavior, and hovering/soaring habits. The combination of abundant food sources, open space, and availability of perching structures on airport grounds and near runway/taxiway areas provides ideal hunting opportunities for many raptors. Also, the behavior of bird species influences the risks, for instance flocking or certain migration patterns and flying altitudes. Development of larger, faster and quieter aircraft, jet engines and intensification of air traffic caused an increase in the number of incidents. Military exercises involve flying at high speed an low altitude, and are exposed to a more serious risk.

Keywords: aircraft; bird species; hunting behavior; many raptors; runway/taxiway.

GJSFR-E Classification : FOR Code : 96049

Strictly as per the compliance and regulations of :

Bird auditory capabilities

- Generally, birds hear generally well within a limited frequency range—between 1 and 5 kHz
  - Usually greater sensitivity in the range of 2 to 4 kHz
- Human hearing spans a wider range (0.03 to 18 kHz) than most birds
  - Birds cannot hear ‘ultrasound’ or ‘infrasound’
  - Generally speaking, if humans can’t hear it, birds can’t either
    - Except possibly pigeons can hear some infrasound
- Even so, bird species vary widely in their ability to hear different sounds

Acoustic Hailing Device (AHD)

- Also called long range acoustic device (LRAD)
- Developed for long-distance communication (up to 2 km) and nonlethal crowd control
- Projects sound in a narrow beam

- **Study Objective**: Evaluate the efficacy of an AHD as a dispersal tool for free-ranging birds recognized as hazardous to aviation safety

Research locations

- Savannah River Site, SC
  - 800 km^2 DoE facility
  - No public access
- Phinizy Swamp Nature Park, Augusta, GA
  - Nature park with constructed wetlands (blackbirds) adjacent to Augusta Bush Field Airport

Birds tested

- Black and turkey vultures
- Gulls
- Blackbirds
- Diving ducks
- American coots

General field methods

- Hyperspike HS-18
  - Maximum 156 dB SPL, beam width 5 degrees
- Field test of wild birds in natural settings
- Identify species-specific responses to AHD treatments at known roosts, bait sites, or other areas where natural aggregations of target species occurred
- Used preprogrammed sounds recommended by manufacturer
- Sounds were repeatedly projected by the AHD in 15 sec bursts followed by 5 sec of silence

Wide range of bird species and corresponding behaviors precluded standardized methods across species

Basic design: bird counts before and after treatment with AHD

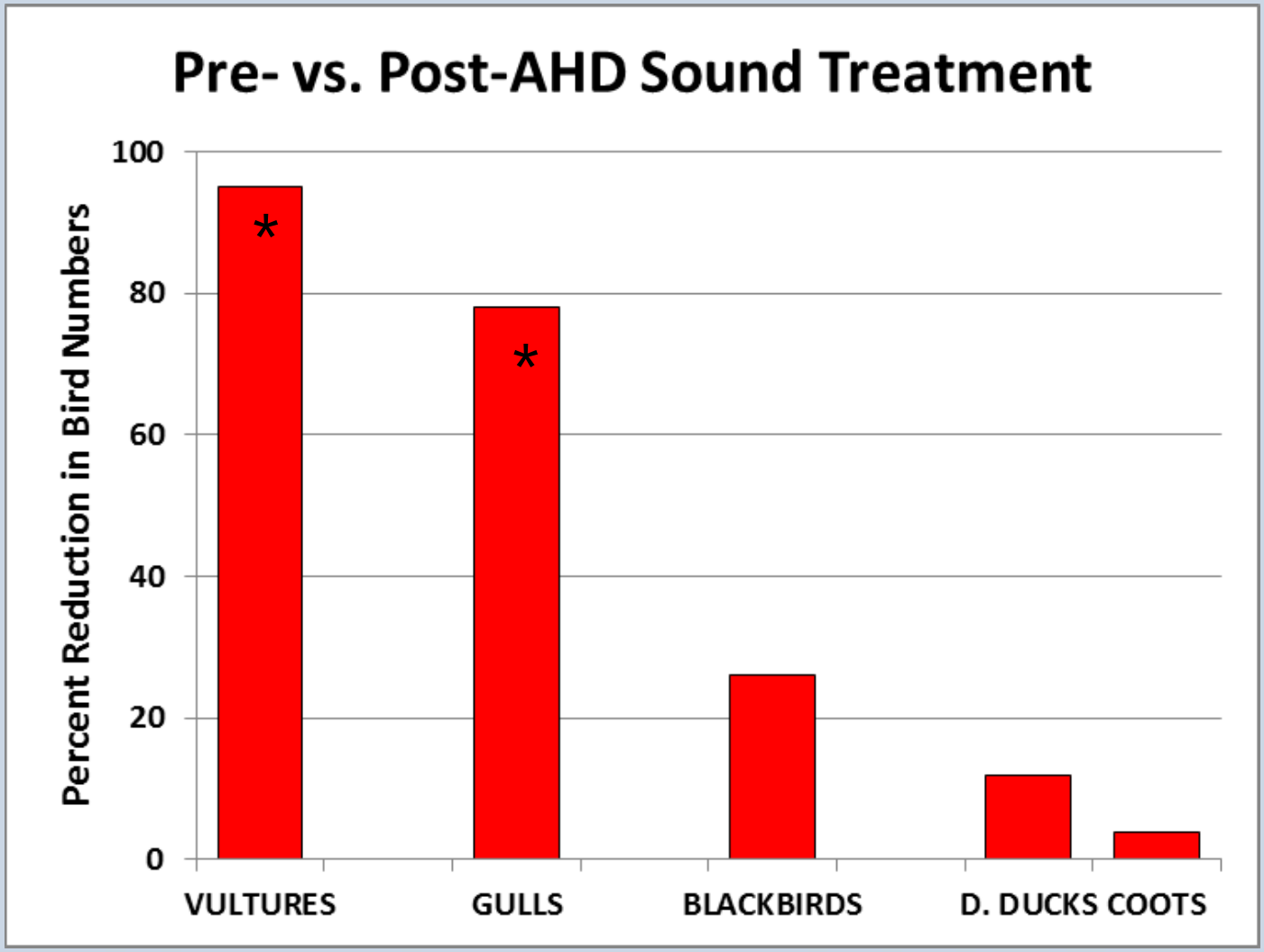
Analyses

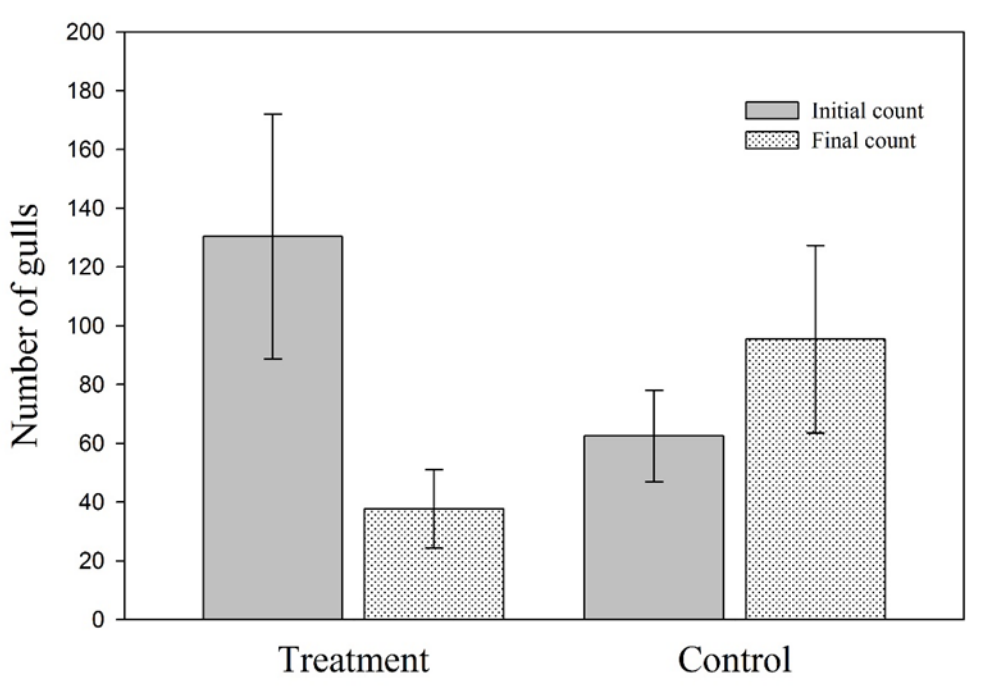
- For most species, counts of birds associated with treatment periods (use of AHD) and control periods (no use of AHD) occurred on consecutive days

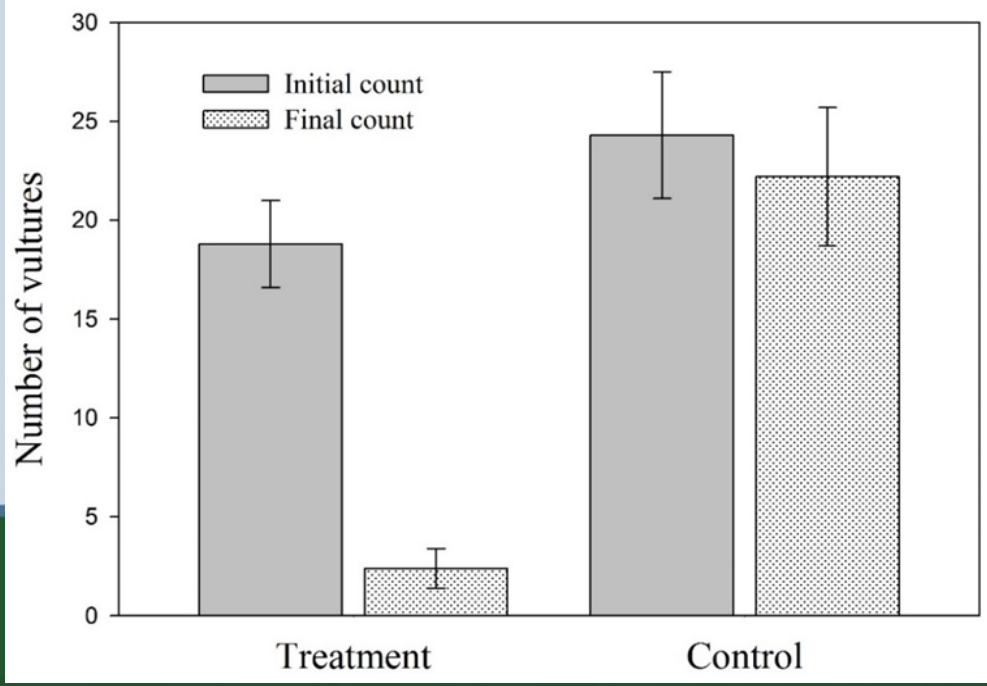
- We mostly used nonparametric analyses because of occurrences of zero counts and non-normal distributions

Results (simplified)

- **Blackbirds** (n = 10 trials): no effect of AHD, *P* = 0.57
  - 26.5% decrease between pre-treatment and treatment days
- **Diving ducks and coots** (n = 87): no effect of AHD, all *P* > 0.25
  - ~10% decrease
- **Gulls** (n = 37): effect of AHD evident, *P* = 0.02
  - 76% decrease
- **Vultures** (n = 21): effect of AHD evident, *P* <0.0001
  - >90% decrease
  - Mean elapsed time to return to bait sites (n = 12) = 12 hr


Pre- vs. Post-AHD Sound Treatment
Percent Reduction in Bird Numbers
100
80
60
40
20
0
*
*
VULTURES
GULLS
BLACKBIRDS
D. DUCKS COOTS





Wildlife Society Bulletin, in press

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Conclusions

- AHD had varying success—responses were species-specific
- Quiet conditions of study were optimal for eliciting a flight response—AHD might be less effective at noisy airports
- Unclear if birds understood where sound was coming from
  - Research on pairing AHD with visual cues might be informative

- **Bottom line**: AHD is unlikely to be useful across a range of applications, but potentially could be effective when specifically targeting vultures, gulls, or potentially other species not tested in our study

Future research

- Integration with other methods for bird dispersal
- Treatments salient to specific target species
- Habituation / sensitization

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Questions or comments?

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