(Air)field of Dreams: Executing a Strategy of Safety and Sustainability at DFW Airport

Cathy Boyles, Wildlife Administrator, Dallas/Fort Worth International Airport
Amanda K. Neill, Botanist at Large

08.23.2017 North American Bird Strike conference

The Pigeon and the Pea: what you don’t know can hurt you

Once Upon a Time…

Once Upon a Time…

Pigeons posed a challenge at DFW Airport…

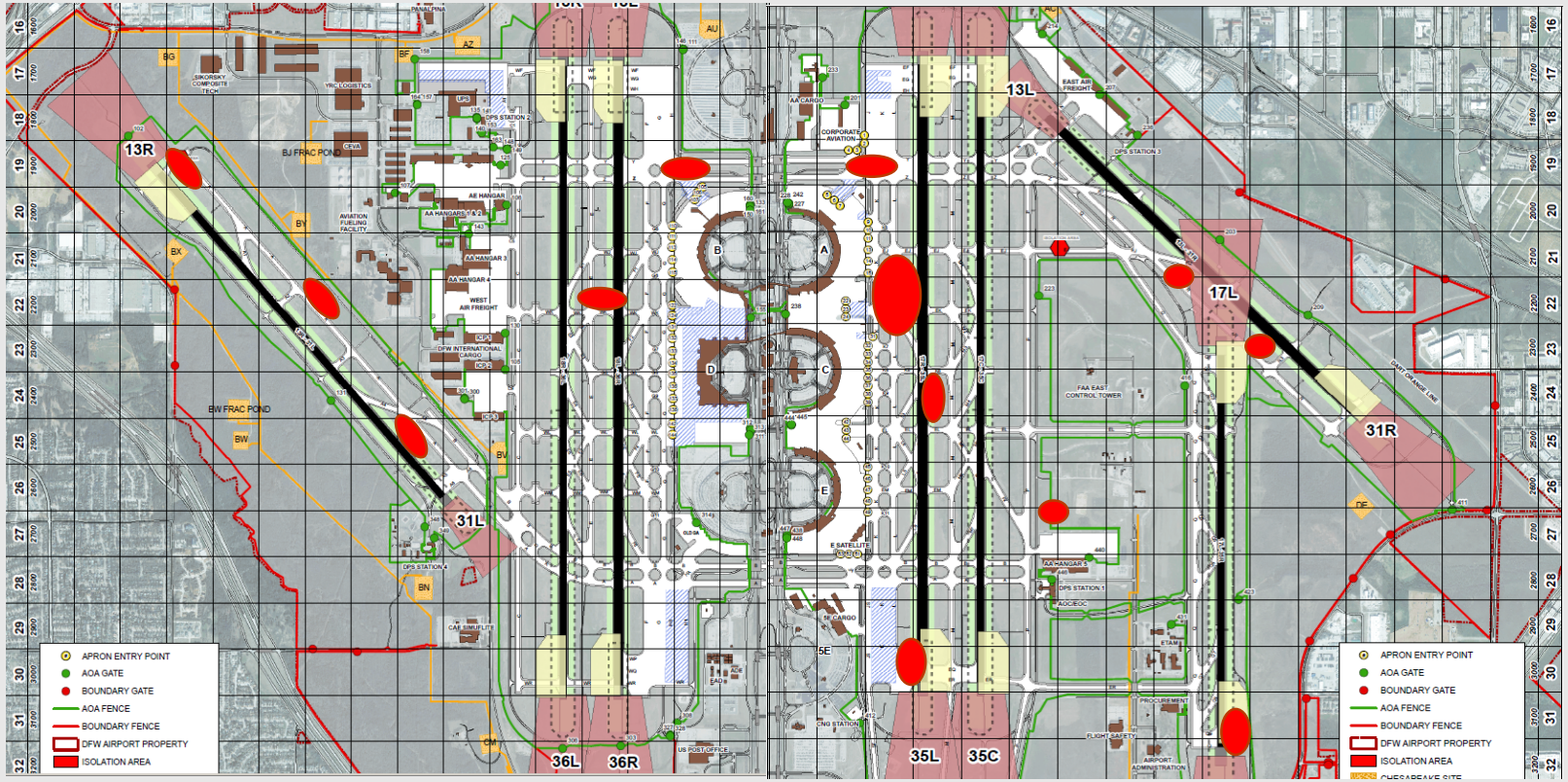
Relevant Bird Activity and History

In recent years, seasonal pigeon activity had been notably persistent in specific areas of DFW's AOA.

- Flocking activity on the AOA typically escalated in early June and continued into October.
- Pigeon flocks number ~ 30-300 individuals.
- Flock sizes and frequency of visits to the AOA diminished or entirely disappeared during the cool fall and winter months.
- Dispersal and depredation efforts were applied with a "Zero Tolerance" policy for pigeons.
  - Pigeons learned to estimate the distance a 12-gauge shotgun can "reach."
  - A professional pigeon trapping program to "lure" pigeons away from the AOA began in 2012 and continued into 2014 with disappointing results.
  - Additional trapping on the AOA was more successful but results were overall disappointing.

Relevant Bird Activity and History

Despite continued “tactical pressure” by airfield staff, pigeons remained strongly attracted to certain areas of the AOA. Pigeons persistently risked survival to remain or return to certain areas of the AOA during the hot summer months.



Areas of persistent pigeon activity documented during the 2014 calendar year

Relevant Bird Activity and History

Wildlife has three basic needs for survival: food, water, and shelter.

No water or shelter was present in these areas. There was no discernable food in these areas.

However, pigeons had a strong, persistent attraction for areas on the AOA, and were observed feeding there.

This behavior was escalating over the years.

Until…

Relevant Strike History

On June 11, 2014 the first of a series of strikes occurred, with a multiple damaging strike and precautionary return. During the following months, nine pigeon strikes negatively affected flight, caused damage, or involved multiple birds. One involve ~ 50 pigeons.

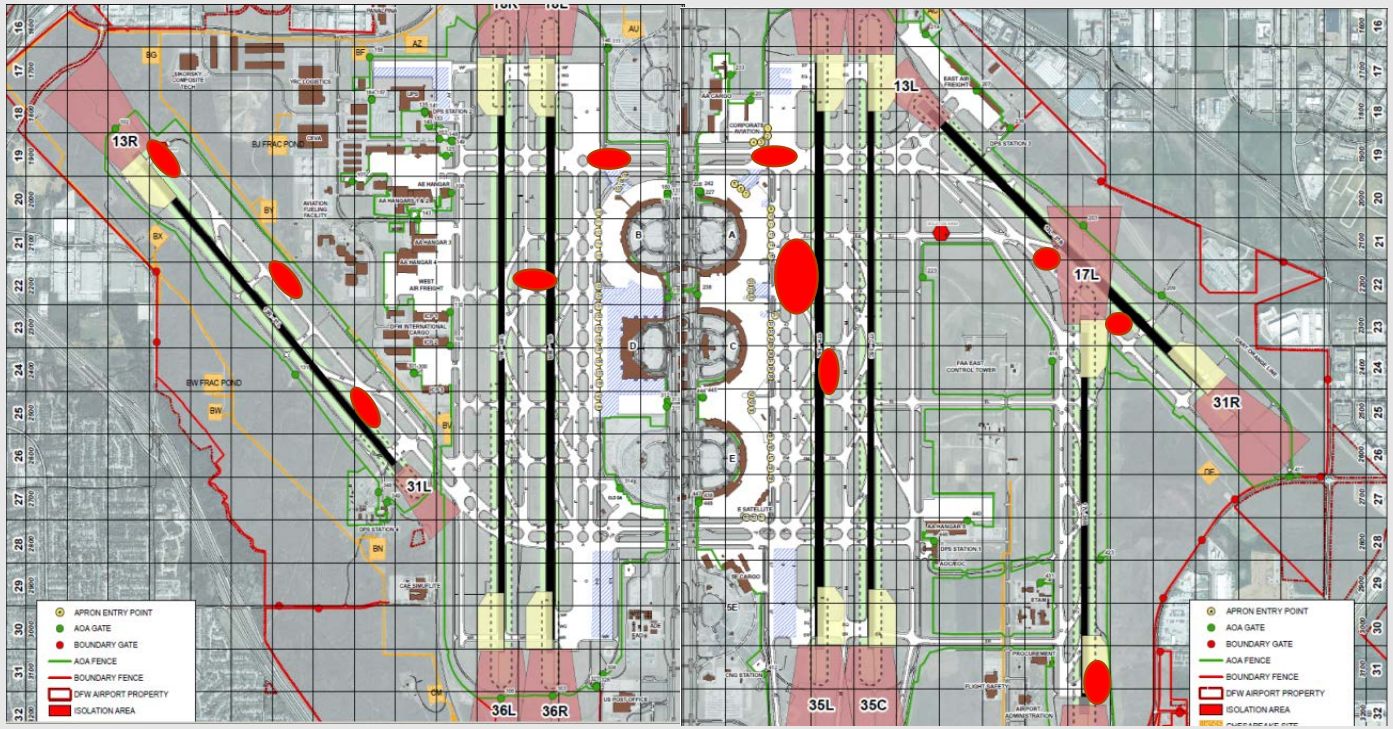
Relevant Strike History

2014 Pigeon Strikes, Adverse Effect

CFR Part 139.337 requires that Certificated Airports “must take immediate action to alleviate wildlife hazards whenever they are detected.”

Relevant Bird Activity and History

Pigeons continued to be persistently attracted to certain areas of the AOA, even while risking depredation.



A study of the contents in the crops of pigeons ensued, to determine what the pigeons were feeding on that attracted them to the AOA.

Sidebar

The crop is an expandable organ that stores both food and grit, which travels to the gizzard to be ground down and digested.

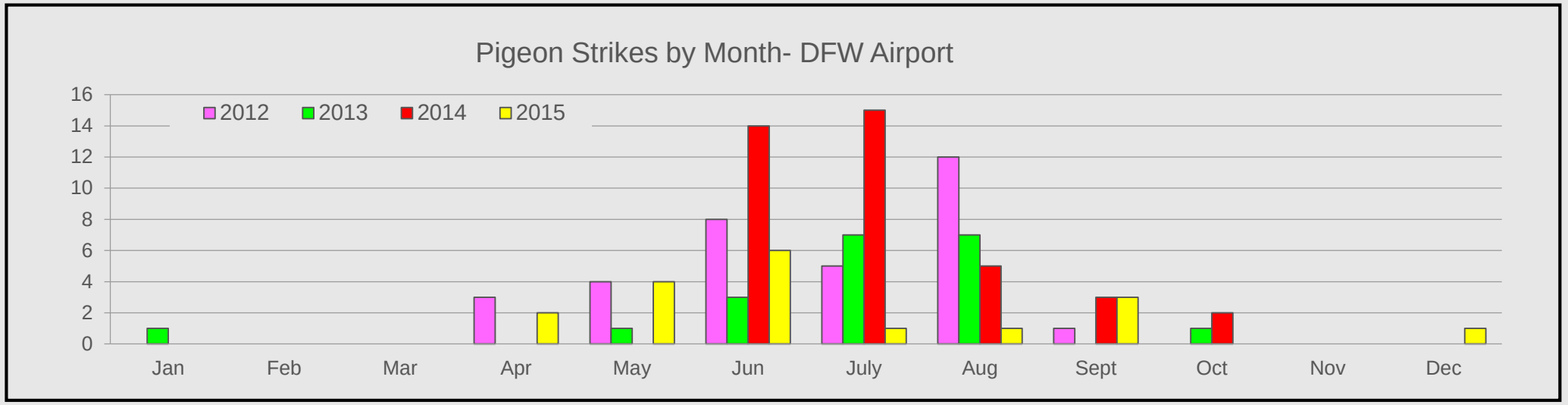
Crop contents were extracted and the seeds sent to Amanda Neill, Director of the Botanic Research Institute of Texas herbarium, for analysis.

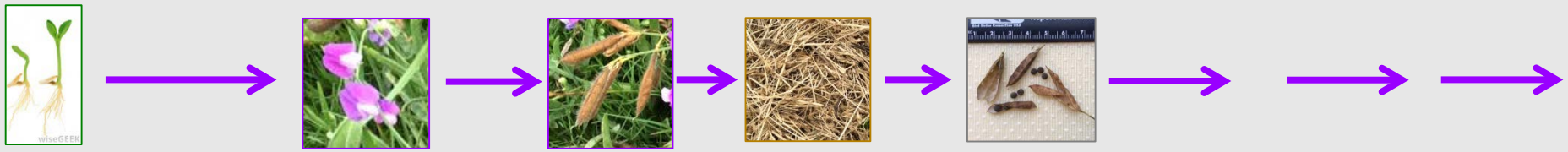
"99% of the seeds in all the samples you sent me were one species, Lathyrus hirsutus, Caley Pea or Singletary Pea… seeds are known to be eaten by birds…

"… this plant species blooms from March-May in this part of TX and produces mature fruits & seeds in May-June… Usually as soon as hot weather arrives they get powdery mildew and decline rapidly, and basically disappear.

The Culprit
A HA!!!

The timeframe of Caley Pea fruit maturation coincided with the timeframe seasonal pigeon activity began to increase on the AOA each year. It stood to reason why there were no visible attractants in areas where pigeons were showing feeding behavior. The plant had already died back, but the seeds were still present on dried plants and on the ground around them.





Caley germinates and grows → Caley blooms → Fruits mature → Plants die back → Seeds not eaten remain as seed bank for future years

The Culprit

The next spring, Caley Pea was discovered growing in numerous areas throughout the AOA.

April 3, 2015, Caley Pea at 13R north end

April 3, 2015, Caley Pea at SW hold pad

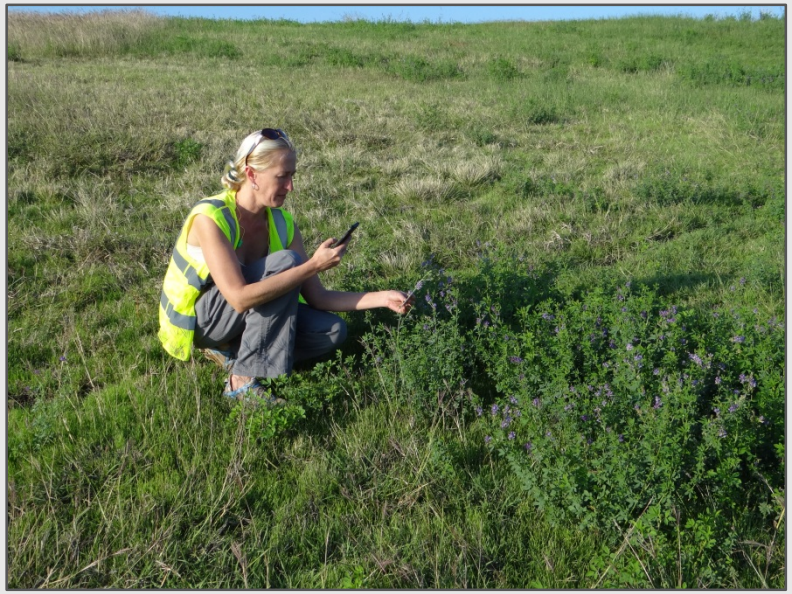
April 7, 2015, Caley Pea at 17L, south end

Flora Survey

This raised questions regarding other potential attractions on and near the AOA.

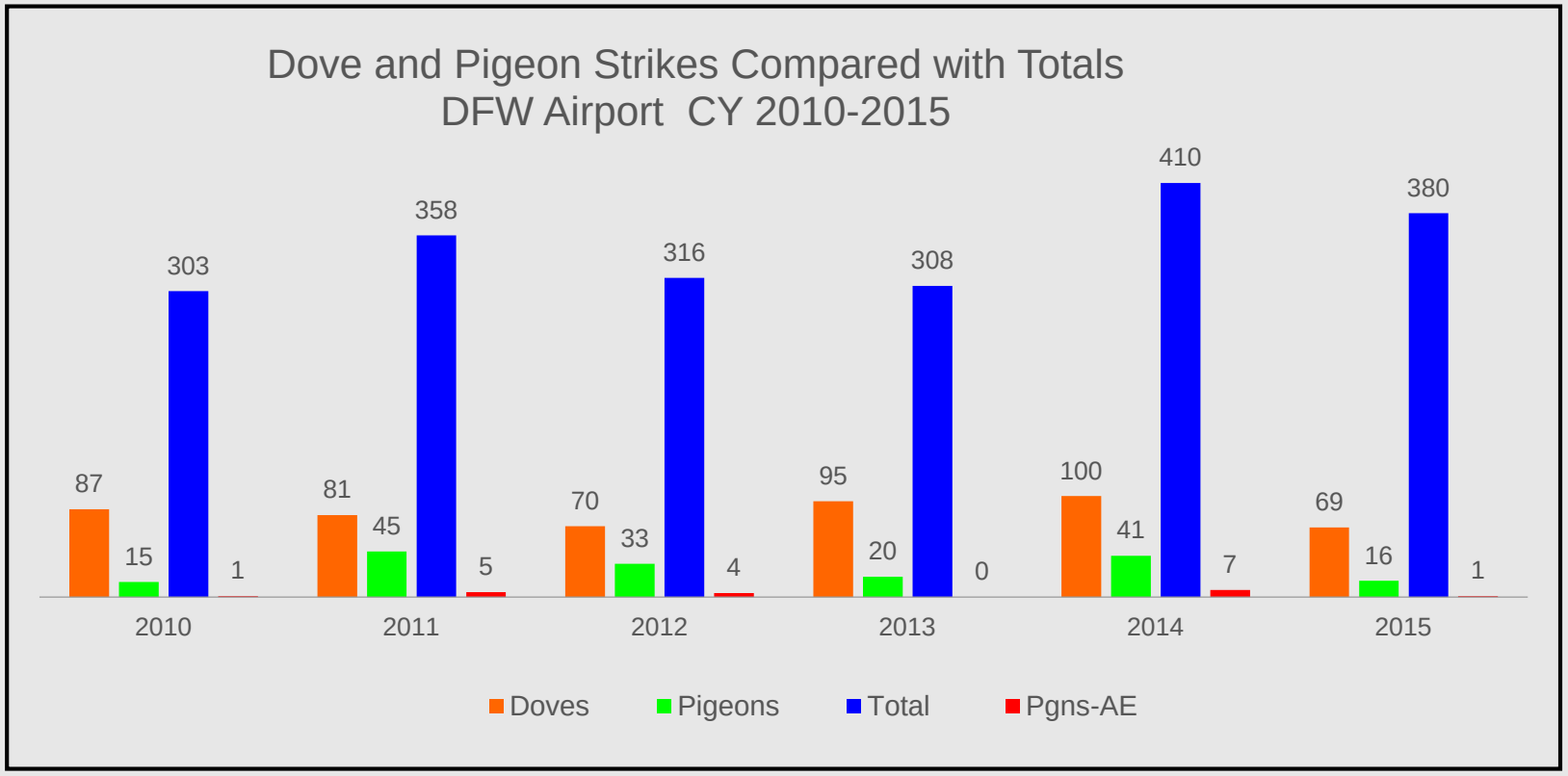
A yearlong study ensued in spring 2015 to conduct a flora study of DFW Airport's AOA.

The purpose of the study was to survey the airport's plants, document the existence of those that are attractive to wildlife, and note their general frequency.



Flora Survey

The Scope included continued extraction for analysis of crop contents from all pigeons depredated or struck by aircraft. Mourning doves were also included, as they are a seed-eating bird and a major contributor to DFW Airport's bird strike numbers.



The Study

(or, *Gut Content Analysis: what your airport's birds are dying to tell you, and how to get it out of them)*

Flora Survey

Throughout 2015, crop contents from all 122 pigeons and doves struck or depredated were analyzed and the seeds identified.

Flora Survey

Seeds from each individual bird were extracted for identification, and placed into bags labeled with date, map grid location, and bird species.

Flora Survey

Crop contents analysis was a critical part of the study, to determine the attractiveness (to seed-eating birds) of plants identified during the field studies.

Concurrent field studies were a critical part of crop content analysis, to confirm identity of seeds found in crops, and verify presence of the plants as growing on or near the AOA.

And the Survey Says…

Botanists… they're so useful!

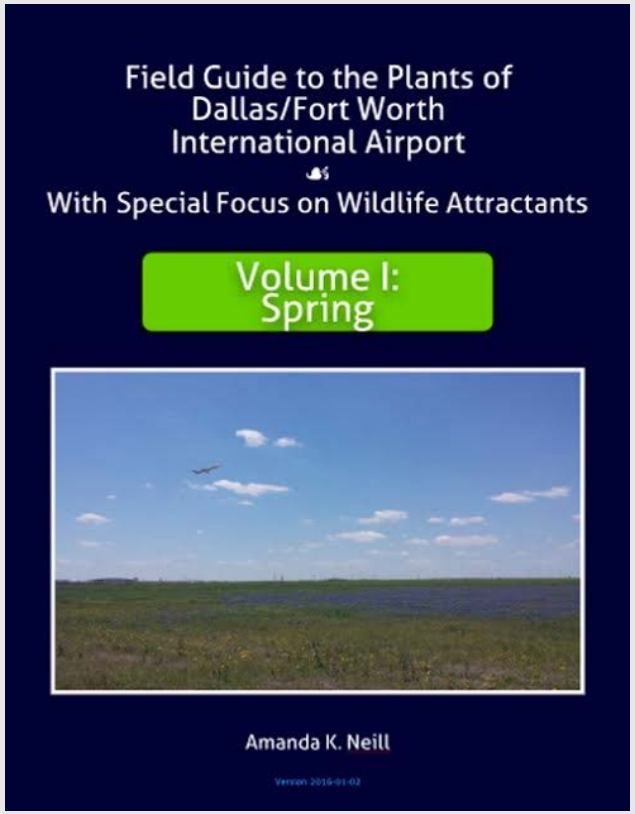
Survey Results

Nearly 200 common plant genera/species were documented for DFW Airport

- 33 species of high concern
- 48 of moderate concern
- 97 of low or no concern

Flora Survey

Survey results were published in 3 field guide volumes, with each guide portraying observed species by season: the spring guide includes plants that were observed in flower and fruit until approximately the end of May, the summer guide includes plants that flower and fruit from June until August, and the fall/winter guide includes those that reproduce until the end of the growing season.



Survey Results

The field guide volumes are available in printable PDF format and as interactive e-books:

http://pub.lucidpress.com/DFWAirportPlantsSpringFieldGuide/

http://pub.lucidpress.com/DFWAirportPlantsSummerFieldGuide/

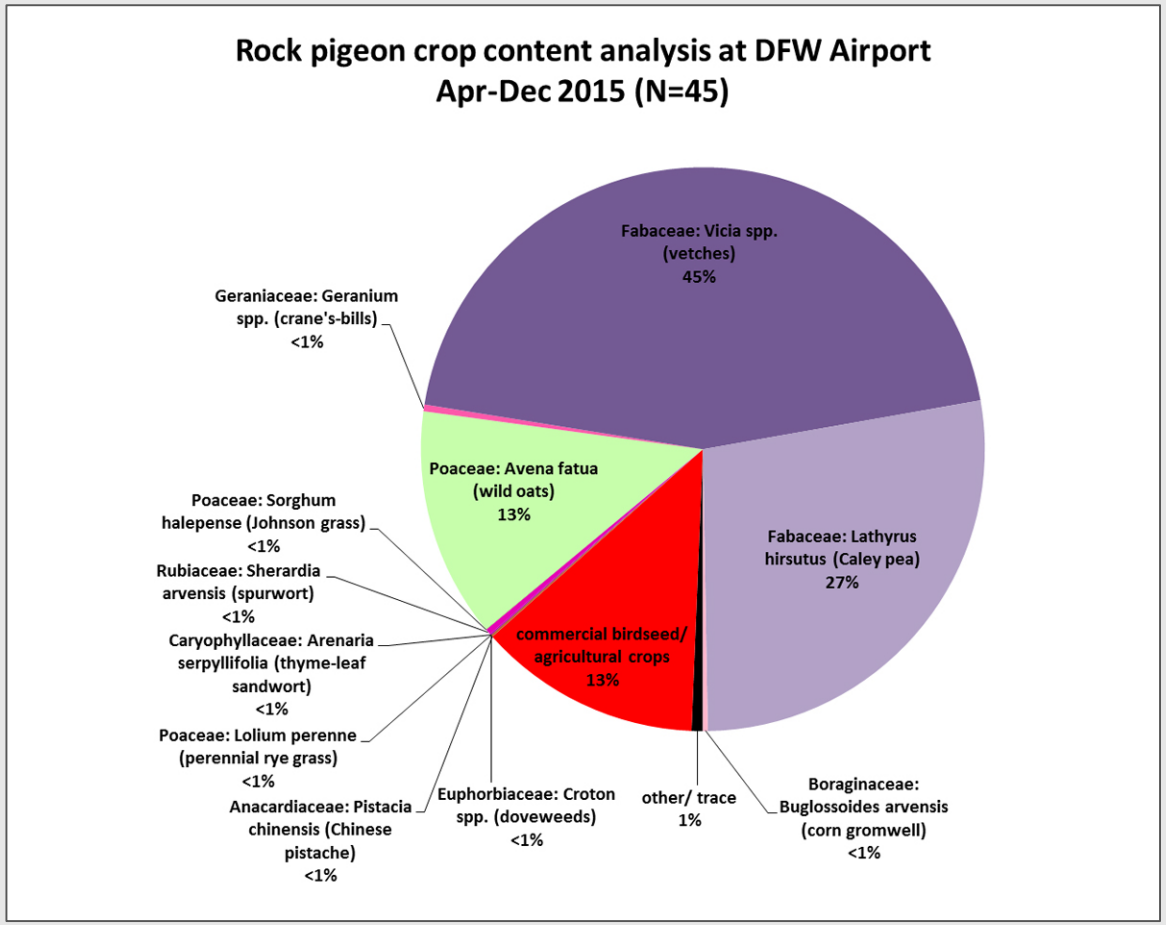
http://pub.lucidpress.com/DFWAirportPlantsFallFieldGuide/

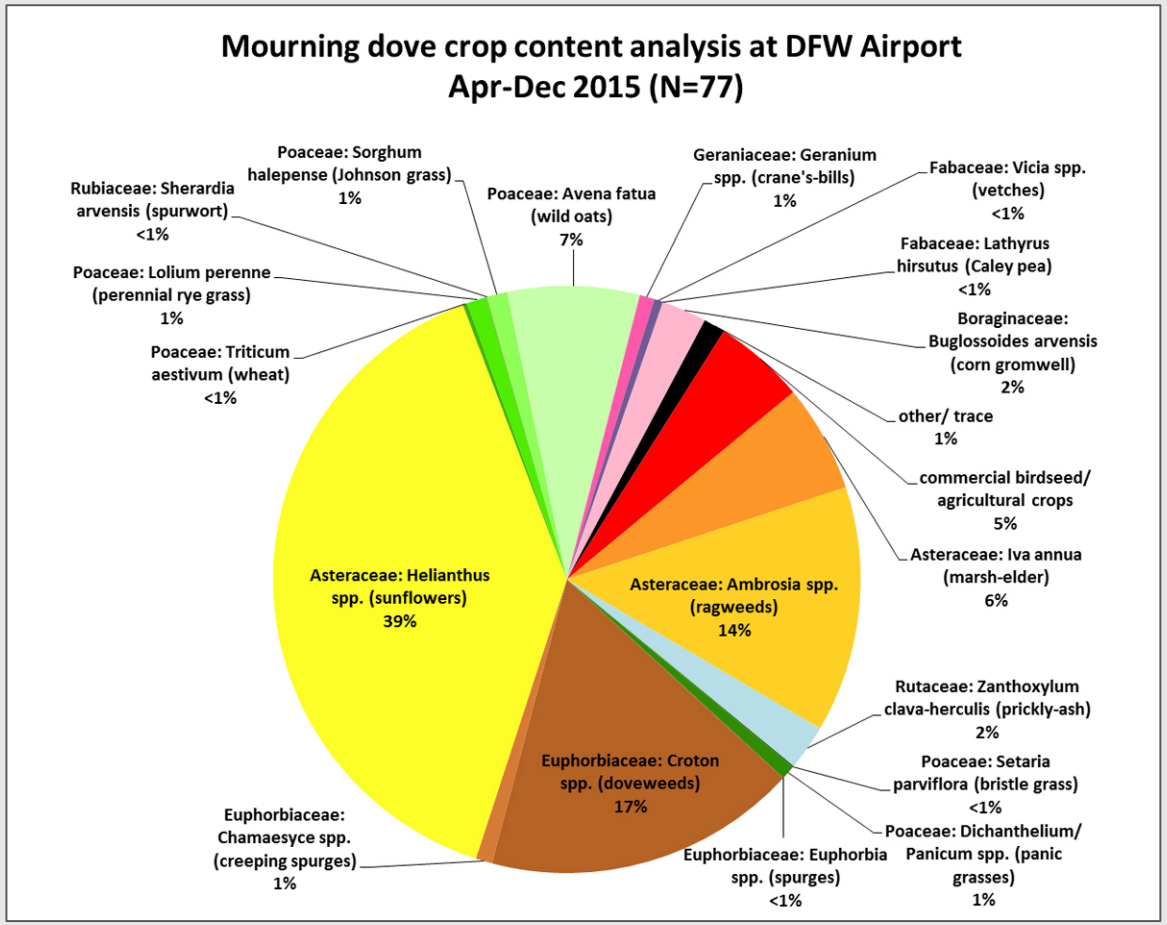
Crop Seed Analysis

Seeds from 122 bird crops were separated by plant species (when a single, distinctive species was present) or genus (when several species in a genus were present) and weighed, in order to determine overall proportional importance to diet.

Crop Seed Analysis

In 2015, pigeons and doves at DFW Airport had strong differences in their diet. Pigeons primarily ate seeds produced by just 3 genera of plants, mostly weeds native to Eurasia. Doves ate a more diverse diet of many species, mostly from plants native to Texas.





Crop Seed Analysis

12 species in eight genera were found to contribute the largest percentages by weight to the crop contents analyzed (with the exception of Johnson grass, included for its noxiousness and ubiquity).

We designated these plants as *attractants of highest concern*.

Caley pea (pigeons)

vetches (pigeons)

wild oats (both)

Johnson grass (both)

sunflower (doves)

doveweed (doves)

ragweeds (doves)

marsh-elder (doves)

Attractants of Highest Concern– AKA *the Dirty Dozen*!

Attractants of Highest Concern

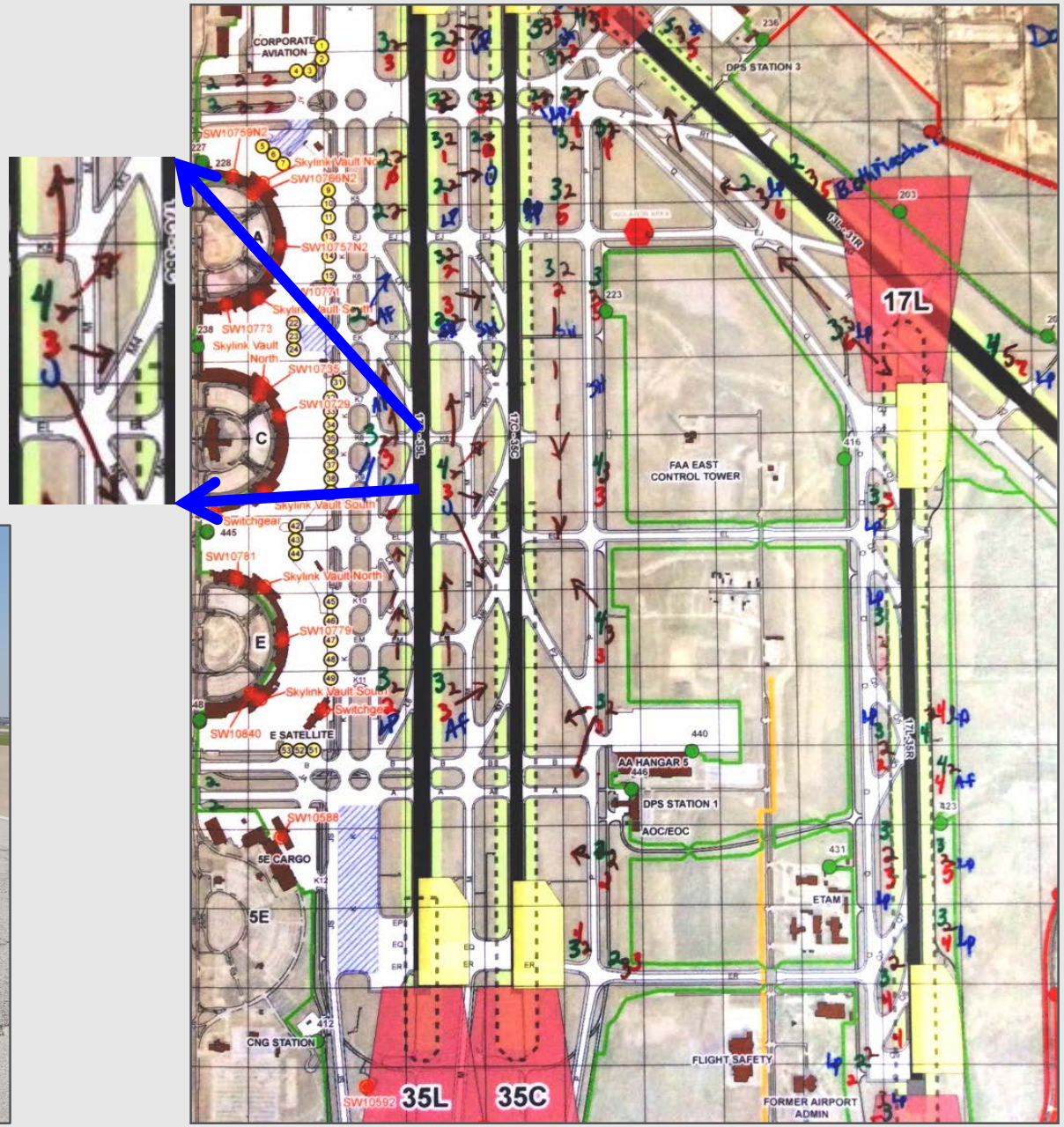
These plants vary by seasonality (cool vs. warm season), lifespan (annual vs. perennial), and by group (broadleaf plants vs. grasses)..

This diversity presents challenges to effective control.

	broadleaf plants	grasses
cool-season annuals	Caley pea, vetches	wild oats
warm-season annuals	doveweed, sunflower, giant ragweed, marsh elder	
perennials	western ragweed	Johnson grass

Vegetation surveys

Vegetation surveys in 2015-2016 revealed many of the attractants of highest concern were widespread and common throughout the AOA.



The Field of Screams!

Mowing has traditionally been the vegetation management tool for airports, but plants outwit mowers...

- Plants are able to lay low, branch out, or simply grow faster than the mowers can cut them down
- Mowing provides a short-term fix rather than long-term sustainability
- Airfield conditions are not always amenable to equipment access
- Weather conditions can prevent equipment access

…The Sequel, applying what we've learned

(Air)field of Dreams: Executing a strategy for safety and sustainability

The Sequel…applying what we've learned…

With an understanding of seasonal patterns and the life history of the plants discovered, we can now appropriately plan and schedule resources to target these attractants.

Sequel

(Air)field of Dreams: Executing a strategy for safety and sustainability

In late 2016, an orchestrated strategy of preemergent and herbicide applications was developed as a collaborative effort between Wildlife, Operations, Grounds Maintenance, the contracted botanist, and a vegetation management specialist.

The program takes into consideration all attractants (annuals and perennials) during all seasons.

Attractant	late fall to early winter	late spring to early summer	summer to fall
cool-season broadleaf weeds	pre-emergents	broadleaf herbicides	
cool-season annual grasses	glyphosate		
warm-season broadleaf weeds		pre-emergents	broadleaf herbicides
Johnson grass (perennial)			Johnson grass-specific herbicide

Sequel

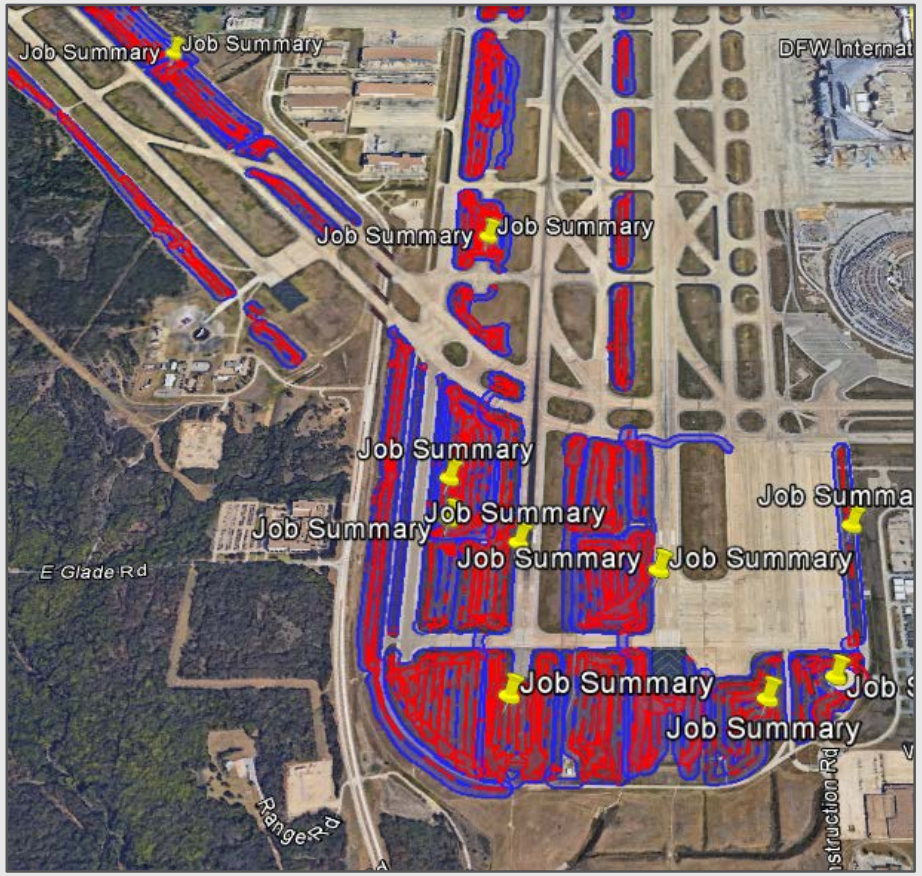
(Air)field of Dreams: Executing a strategy for safety and sustainability

Implementation began in fall 2016. It's expected that several applications over the next two-three years will have great impacts.

Sequel

(Air)field of Dreams: Executing a strategy for safety and sustainability

Application routes and timing are digitally tracked to ensure we are accurately documenting treatments and to be able to correlate these with observations.



Sequel

(Air)field of Dreams: Executing a strategy for safety and sustainability

Effects of last year’s ramped up habitat management efforts combined with the new program are already visible on the AOA.

Sequel

(Air)field of Dreams: Executing a strategy for safety and sustainability

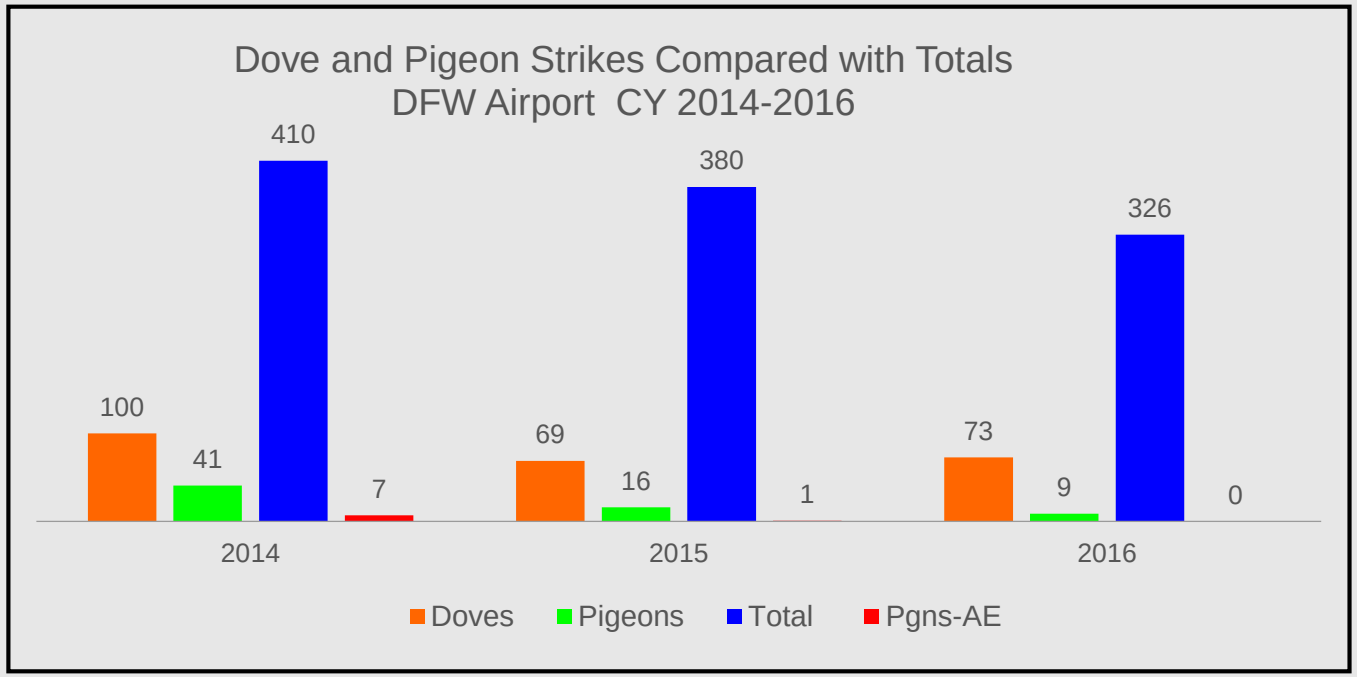
We’ve formed an Airfield Management Working Group that continues to evaluate progress, meeting regularly to discuss results and new findings.

Sequel

(Air)field of Dreams: Executing a strategy for safety and sustainability

Positive effects on safety may also be taking place.

Coupled with an enhanced pigeon trapping program in 2015, pigeon-focused airfield staff, and an early round of herbicides, pigeon strikes decreased in 2015. Nine pigeon strikes occurred in summer 2016, none of them triggering events, and two pigeon strikes have occurred at DFW Airport since July 2016.



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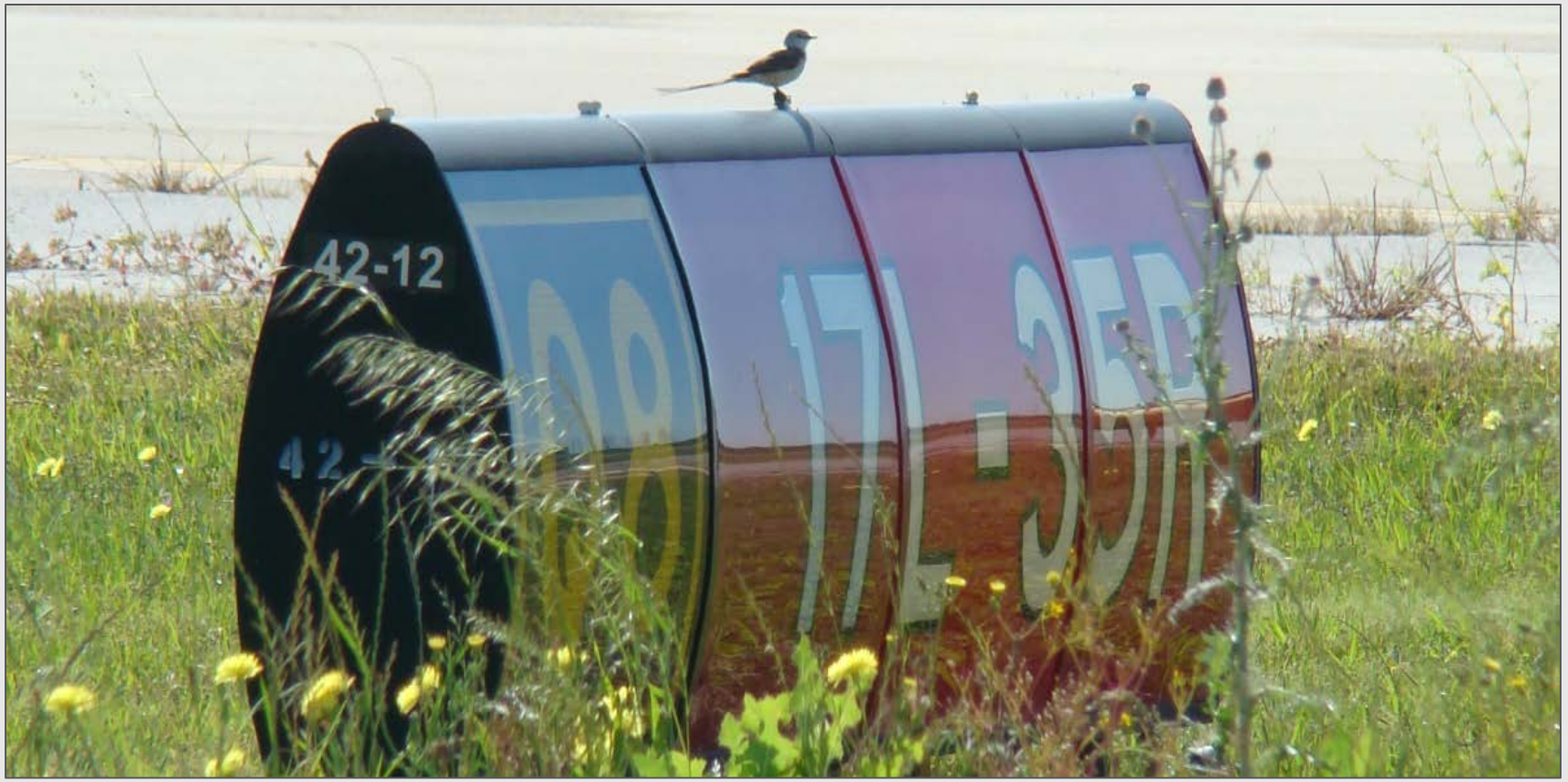
Airfield conditions often prevent access of maintenance equipment to the AOA when needed, allowing undesirable vegetation to take over, attracting wildlife and blocking signs.



Sequel

(Air)field of Dreams: Executing a strategy for safety and sustainability

Once the undesirable broadleaf vegetation and Johnson grass has been mitigated, blocked signs will become a thing of the past.

Sequel

(Air)field of Dreams: Executing a strategy for safety and sustainability

Safety, with benefits!

- Mitigate lush vegetation, increasing aviation safety by reducing habitat for insects and rodents

Sequel

(Air)field of Dreams: Executing a strategy for safety and sustainability

Safety, with benefits!

- Minimize need for mowing, which can be a wildlife attractant
- Reduced need for runway closures for equipment access
- Reduced need for wildlife hazing on and near runways

Sequel

(Air)field of Dreams: Executing a strategy for safety and sustainability

Safety, with benefits!

- Unpredicted indirect aviation safety effects

Sequel

(Air)field of Dreams: Executing a strategy for safety and sustainability

Safety, with benefits!

- Decreased frequency of mowing (<3x per year)
- Reduced fuel, emissions, and resource demands

Sequel

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In addition, our discoveries and lessons learned are being shared with the North Central Texas Wildlife Consortium.

The North Central Texas Wildlife Consortium consists of regional airports that gather quarterly to share knowledge and best practices.

Wildlife Hazard Mitigation Strategies at DFW Airport: balancing safety and stewardship

Partnerships

It takes all of us

- Energy, Transportation, & Asset Management- Grounds
- Vegetation Management Specialist
- Contracted botanist
- Airfield Operations

Thank you

Come see us at the Exhibitor Demos