# Vultures and Your Airport



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#### Acknowledgments





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# Grasslands and Change



Science Advances 25 Mar 2016:Vol. 2, no. 3, e1501346



Red-tailed Hawk (all forms) [Buteo jamaicensis]



Black Vulture [Coragyps atratus]



https://www.mbr-pwrc.usgs.gov/

Black Vulture [Coragyps atratus]



Turkey Vulture [Cathartes aura]





Buckley, N. J. (2020). Black Vulture (*Coragyps atratus*), version 1.0. In Birds of the World (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. <u>https://doi.org/10.2173/bow.blkvul.01</u>

Kirk, D. A. and M. J. Mossman (2020). Turkey Vulture (*Cathartes aura*), version 1.0. In Birds of the World (A. F. Poole and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. <u>https://doi.org/10.2173/bow.turvul.01</u>

#### Smithsonian

#### SMART NEWS

#### Federally Protected Black Vultures May Be 'Eating Cows Alive' in the Midwest

Farmers are seeking permits to cull any raptors harming their livestock, but experts say reports of

#### NATION

#### Black vultures are eating cows alive. Now some farmers can legally shoot the protected birds.

Sarah Bowman Indianapolis Star Published 5:43 p.m. ET Aug. 17, 2021 | Updated 4:57 p.m. ET Aug. 24, 2021

Farmers are seeking permits to cull any raptors harming their livestock, but experts say reports of vicious attacks are exaggerated



Scientists suspect that the vultures have expanded into Indiana in the past few decades because of climate change and changes in land use. Rangerbob 13 via Wikicommons under CC BY 4.0



#### New World Vultures: Exceptional Sight and Smell







- · Ability to locate food by smell
- Ethyl mercaptan
- Natural-gas companies adding odorant into pipelines discovered leaks where vultures were circling<sup>2</sup>
  - Relative size of brain's olfactory bulb is ninth largest of 108 avian species <sup>3</sup>





(Martine)



## Look the same: $\sigma$ and $\varphi$



Sexed genetically: Sexed using blood samples





 Establishment of a Federal prohibition, unless permitted by regulations, to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to purchase, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention . . . for the protection of migratory birds . . . or any part, nest, or egg of any such bird." (16 U.S.C. 703)







# **36 strikes** 2000 - 2019

Mean  $\pm$  95% CI

- Time of the day 13:21 (12:32 14:01)
- Altitude m AGL: 253 (192 355)
- Altitude ft AGL: 830 (629 1164)



#### T-45A CRASH SITE NAS MERIDIAN MAY 20 2008 CLASS ALPHA MISHAP \$21,736,000.00 Pectoral Sandpiper (2.3 ounces)











![](_page_11_Picture_1.jpeg)

![](_page_12_Picture_0.jpeg)

![](_page_13_Picture_0.jpeg)

![](_page_13_Picture_1.jpeg)

![](_page_13_Picture_2.jpeg)

![](_page_13_Picture_3.jpeg)

![](_page_14_Picture_0.jpeg)

Please report wing-tagged vultures to Dr Scott Rush at Mississippi State Tel: 662-325-0762 Email: scott.rush@msstate.edu

Please include date, location and the number on the tag.

# MISSISSIPPI STATE

![](_page_15_Picture_0.jpeg)

## Sex ratios by site

![](_page_15_Figure_2.jpeg)

![](_page_15_Figure_3.jpeg)

## Mass by age and sex

![](_page_16_Figure_1.jpeg)

![](_page_16_Picture_2.jpeg)

![](_page_17_Picture_0.jpeg)

## Age ratios by site

![](_page_17_Figure_2.jpeg)

![](_page_18_Figure_0.jpeg)

![](_page_18_Picture_1.jpeg)

![](_page_18_Picture_2.jpeg)

![](_page_18_Picture_3.jpeg)

Wing-tagged dispersal (294 resighting records)

![](_page_19_Picture_1.jpeg)

![](_page_19_Picture_2.jpeg)

![](_page_20_Picture_0.jpeg)

![](_page_20_Figure_1.jpeg)

![](_page_20_Figure_2.jpeg)

![](_page_20_Figure_3.jpeg)

![](_page_21_Figure_0.jpeg)

![](_page_22_Picture_0.jpeg)

## GPS-tagged vulture dispersal (>1.9M GPS fixes)

![](_page_22_Figure_2.jpeg)

![](_page_23_Figure_0.jpeg)

![](_page_23_Picture_1.jpeg)

#### **BLVU**

GTR birds and ASY 9 (Meridian) move greatest distances

TUVU

Much seasonal

immigration/emigration,

especially Meridian

## Movements by Season

![](_page_24_Picture_1.jpeg)

![](_page_24_Figure_2.jpeg)

A. Spring, B. Summer, C. Fall, D. Winter

## Flying performance relative weather conditions

![](_page_25_Picture_1.jpeg)

![](_page_25_Figure_2.jpeg)

## Flying performance relative weather conditions

![](_page_26_Picture_1.jpeg)

![](_page_26_Figure_2.jpeg)

## Average flight altitude

HERIES AND

![](_page_27_Figure_1.jpeg)

## Average flight altitude

HERIES AND

![](_page_28_Figure_1.jpeg)

## Vulture recursions (Day)

![](_page_29_Picture_1.jpeg)

![](_page_29_Figure_2.jpeg)

A.Spring B.Summer C.Fall D.Winter

## Vulture recursions (Night)

![](_page_30_Picture_1.jpeg)

![](_page_30_Figure_2.jpeg)

A.Spring B.Summer C.Fall D.Winter

![](_page_31_Figure_0.jpeg)

## A. Spring, B. Summer, C. Fall, D. Winter

#### Vultures recursions

![](_page_32_Picture_1.jpeg)

![](_page_32_Picture_2.jpeg)

#### Vultures recursions

![](_page_33_Picture_1.jpeg)

![](_page_33_Picture_2.jpeg)

#### Vultures recursions

![](_page_34_Picture_1.jpeg)

![](_page_34_Picture_2.jpeg)

#### Vultures diurnal roosting sites

![](_page_35_Picture_1.jpeg)

![](_page_35_Picture_2.jpeg)

#### Vultures diurnal roosting sites

![](_page_36_Picture_1.jpeg)

![](_page_36_Picture_2.jpeg)

#### Vultures diurnal roosting sites

![](_page_37_Picture_1.jpeg)

![](_page_37_Picture_2.jpeg)

#### Vultures nocturnal roosting sites

![](_page_38_Picture_1.jpeg)

![](_page_38_Picture_2.jpeg)

#### Vultures nocturnal roosting sites

![](_page_39_Picture_1.jpeg)

![](_page_39_Picture_2.jpeg)

#### Vultures nocturnal roosting sites

![](_page_40_Picture_1.jpeg)

![](_page_40_Picture_2.jpeg)

#### **© OKLAHOMA STATE UNIVERSITY**

![](_page_41_Picture_1.jpeg)

Home / Articles / Cattle producers should watch for signs of blackleg and anthrax after floodwaters recede

#### Cattle producers should watch for signs of blackleg and anthrax after floodwaters recede

Thursday, June 13, 2019

![](_page_41_Picture_5.jpeg)

![](_page_41_Picture_6.jpeg)

Search Q

The immediate danger of livestock lost to floodwaters may be receding, but post-flood diseases may now be an issue for cattle operations. (Photo by Todd Johnson, OSU Agricultural Communications Services)

![](_page_41_Picture_8.jpeg)

![](_page_41_Picture_9.jpeg)

![](_page_42_Picture_0.jpeg)

![](_page_42_Figure_1.jpeg)

CCA1

![](_page_43_Picture_0.jpeg)

10

## **Biochemical Indices**

ALK: alkaline phosphatase (energy transfer)
AST: aspartate aminotransferase
ALT: alanine aminotransferase
Creatinine: muscle catabolism Calcium Triglycerides Albumin Cholinesterase

![](_page_43_Picture_4.jpeg)

![](_page_43_Figure_5.jpeg)

![](_page_44_Picture_0.jpeg)

# Meridian by sex of BLVU

![](_page_44_Figure_2.jpeg)

![](_page_45_Picture_0.jpeg)

# Meridian by age

![](_page_45_Figure_2.jpeg)

## Stress and catabolism

![](_page_46_Figure_1.jpeg)

#### Cholinesterase

![](_page_46_Figure_3.jpeg)

#### Creatinine

![](_page_46_Figure_5.jpeg)

#### **Cholinesterase** Meridian, high stress across ages

#### Cholinesterase

Males, high stress across ages

**Creatinine** GTR, movement across ages Meridian, highest in ASY

![](_page_47_Figure_0.jpeg)

\*Sam Zhang, Macaulay Library

# Corticosteroid and sex ratios

Maternal corticosteroids influence primary offspring sex ratio in a free-ranging passerine bird

**Frances Bonier, Paul R. Martin, and John C. Wingfield** Department of Biology, University of Washington, Box 351800, Seattle, Washington 98195-1800, USA

![](_page_48_Figure_4.jpeg)

![](_page_48_Figure_5.jpeg)

![](_page_49_Picture_0.jpeg)

![](_page_49_Picture_1.jpeg)

![](_page_49_Figure_2.jpeg)

![](_page_49_Figure_3.jpeg)

![](_page_49_Picture_4.jpeg)

![](_page_50_Picture_0.jpeg)

![](_page_50_Figure_1.jpeg)

## Chlamydia psittaci

- Lethal, intercellular bacteria
- Most often in birds, can affect people
- Can spread through direct contact or
- Can be treated with antibiotics

aerosolize

![](_page_51_Figure_6.jpeg)

![](_page_51_Picture_7.jpeg)

![](_page_52_Picture_0.jpeg)

## Antibiotic Resistant Bacteria

![](_page_52_Figure_2.jpeg)

![](_page_52_Figure_3.jpeg)

#### How does antibiotic resistance occur?

Antibiotics kill

from infection.

![](_page_52_Picture_5.jpeg)

High number of bacteria. A few of them are resistant to antibiotics.

![](_page_52_Picture_7.jpeg)

The resistant bacteria now bacteria causing the illness, have preferred conditions to as well as good bacteria grow and take over. protecting the body

Bacteria can even transfer their drug-resistance to other bacteria, causing more problems.

![](_page_53_Picture_0.jpeg)

Fairson contant

![](_page_53_Figure_1.jpeg)

Estradiol concentrations

![](_page_53_Picture_3.jpeg)

![](_page_53_Picture_4.jpeg)

Table 5. Quantity of estradiol in beef muscle relative to human estradiol production

Estradiol clearance rate in normal humans (male or female) Estradiol content in 100 g of beef muscle Time required to clear 1250 pg Daily estradiol production in men Estradiol content in 100 g of beef muscle Quantity of beef muscle that would contain 30 micrograms of estradiol

1250 ng/ hou 1250 pg 3.6 seconds 25-60 microg 1250 picogra

2,400,000 g

ur	Food	(ng/g food)	(ng/3 oz food)		
grams ams	Steer beef, implanted Wheat germ	0.022 4	1.9 340		
	Soybean oil	2,000	168,000		
(5,286 lb)	Milk	0.130	11.0		
	Syntex Agribusiness (1987)				

# **Is Food Limiting?**

## Example: Pine Ridge Birds consume only ~ 2 % of available / day

BLVU consumes ~ 700 g / day Avg. 300 birds / day at site

**300 birds \* 700 g / bird = 210,000 g / day** Consume ~ 463 lbs / day

~ 30 trucks day enter site ~ 8 tons material / truck If 5 % of each truck is edible (by vultures) 30 \* 8 \* 0.05 = 12 tons / day

**12 tons = 24,000 lbs edible /day** 

![](_page_54_Picture_6.jpeg)

ECONOMY

# There's never been such a severe shortage of homes in the U.S. Here's why

March 29, 2022 · 7:00 AM ET

![](_page_55_Picture_3.jpeg)

![](_page_55_Picture_4.jpeg)

![](_page_55_Picture_5.jpeg)

![](_page_55_Picture_6.jpeg)

![](_page_55_Picture_7.jpeg)

![](_page_56_Picture_0.jpeg)

![](_page_57_Picture_0.jpeg)

# Remove/limit potential nest sites

![](_page_57_Picture_2.jpeg)

![](_page_58_Figure_0.jpeg)

![](_page_59_Picture_0.jpeg)

![](_page_59_Picture_1.jpeg)

![](_page_59_Picture_2.jpeg)

# Where and why, vultures?

![](_page_60_Picture_1.jpeg)

![](_page_60_Figure_2.jpeg)

![](_page_60_Picture_3.jpeg)

SCIENTIFIC COLLECTING Permit Number: MB70314D Version Number: 3 Effective: 2022-04-01 Expires: 2025-03-31

Species	Viable Eggs –	Trap and relocate	Collection Period	State
	Return to Nest			
Black Vulture	10	4	1 year	MS

## Translocations: What do they use and why?

![](_page_61_Picture_1.jpeg)

![](_page_61_Figure_2.jpeg)

![](_page_61_Figure_3.jpeg)

![](_page_62_Picture_0.jpeg)