Long-billed Curlew Ecology and Conservation in the Intermountain West

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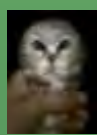
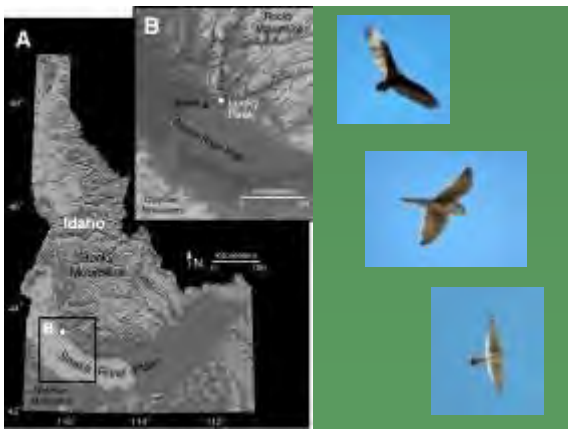
Intermountain Bird Observatory, Department of Biological Sciences, Boise State University

https://ibo.boisestate.edu

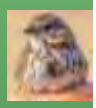
- Academic research and community outreach program of Boise State University
- Mission: Impacting human lives and significantly contributing to conservation through a unique combination of cooperative research focusing on migratory birds, education, discovery of the natural world, and community engagement.

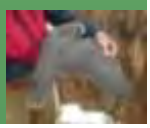




IBO Programs in Boise Foothills During Autumn Migration

- Songbirds (July 16 – October 15)
  - Mist-netting/banding
  - Research on stopover ecology, habitat use, etc.
- Raptors (late August – late October)
  - Diurnal raptors & small forest owls
  - Hawk migration counts
  - Trapping and banding of hawks and owls
- Community Outreach
  - Students, volunteers, school groups, etc.





IBO Boise River site

Introduction

The *Numeniini*

13 species: 7 critically endangered, endangered, or near threatened

Shared characteristics:

- long-distance migration
- low fecundity
- ground-nesting

Key research needs:

- monitor breeding population trends
- study migratory connectivity
- monitor land-cover change (breeding and non-breeding areas)

Photo: Alexander Sapiens

Pearce-Higgins et al. 2017. **A global threats overview for Numeniini populations: synthesising expert knowledge for a group of declining migratory birds**

Introduction

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- ground-nesting

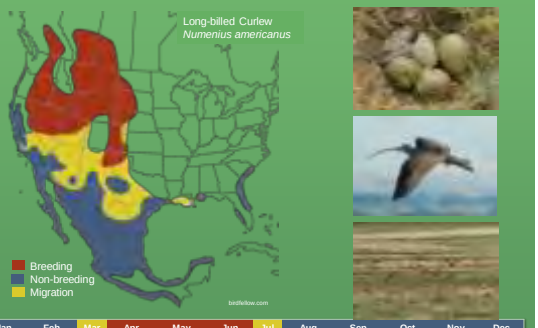
Photo: Alexander Sapiens

Long-billed Curlew
North American shorebird
Breeds in grasslands and mixed-grassland habitats

Compared to other Numeniini:
- shorter migrations
- more of a habitat generalist
- protections in place, in time

(Dugger and Dugger 2002, Pearce-Higgins et al. 2017)

Annual Cycle



(Dugger and Dugger 2002)

Status

Species of Greatest Conservation Need – *State Wildlife Action Plans*

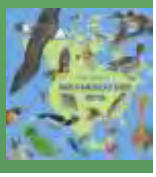
Bird of Conservation Concern – *USFWS*

Sensitive Species – *BLM*

Species of Special Concern – *Canada Species at Risk Act*

"Highly imperiled" – *U.S. and Canadian Shorebird Plans*

2016 State of the Birds Watch List



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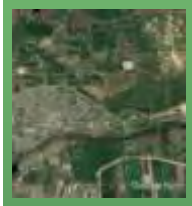
Potential Threats to Curlews



Habitat Loss and Degradation in nesting and wintering areas.

Anthropogenic disturbance such as roads and illegal shooting.

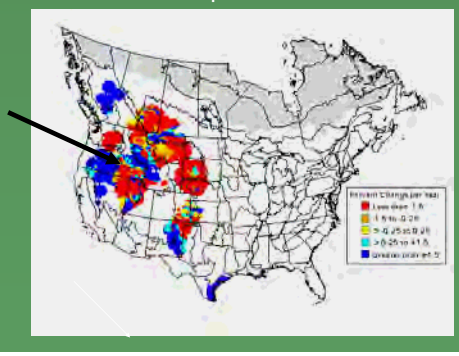
Ongoing identification of wintering ground threats.

(Samson et al. 2004, Dugger and Dugger 2002, Conner 2001, Gill et al. 1996, Frayer et al. 1989, Blus et al. 1985)

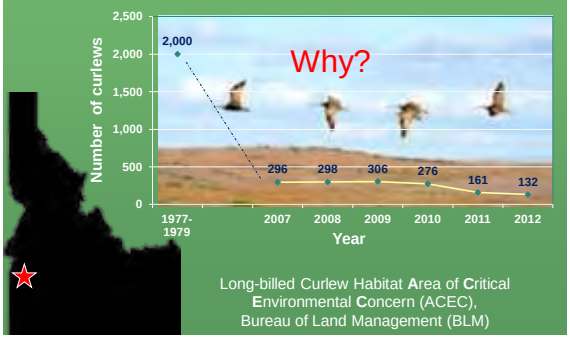
But, why should the average person care about a *curlew*??

- Very unique bird!
- Natural pest control
  - Eat spiders, beetles, grasshoppers, grubs, worms, etc.

Long-billed Curlew Breeding Bird Survey (BBS) Trend Map: 1966 - 2013



Where IBO got involved in 2009



Long-billed Curlew Habitat **A**rea of **C**ritical **E**nvironmental **C**oncern (ACEC), Bureau of Land Management (BLM)

- Human disturbance and high predator #s
  - Low nesting success, high adult mortality

20+ shootings, 10 years

7/16 with transmitters on BLM!

Curlew Community Outreach

- Goals:
  - Reduce illegal shooting
  - Build a conservation ethic among recreationists

Early Accomplishments

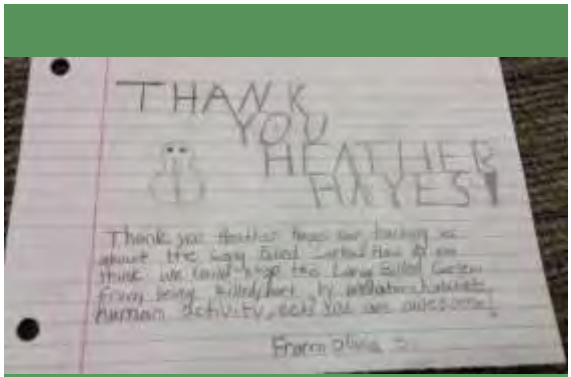
- Worked with local recreation groups and agencies on developing signage, brochures, and other outreach materials
  - BLM, Idaho Department of Fish and Game, US Fish & Wildlife Service, Idaho Varmint Hunters Association, Emmett Rough Riders, Underground Guns, etc.

Curlew Community Outreach Approach

- Curlews in the Classroom
- Curlews out of the Classroom
- Weekend Warrior Awareness Campaign
- Hunter's Education classes
- other community events
  - STEM festivals, youth events, etc.

Curlews in the Classroom

- **2015-16:**
  - 3,123 students in 82 classes from 25 different schools in nine cities
- **2016-17:**
  - 5,485 students in 184 classes from 28 different schools in eleven cities
- **2017-18:**
  - 2,070 students in 64 classes from 11 different schools in five cities
- Lesson plans, a teacher forum, and regular updates to participating classrooms




I get money to protect my family


IDAHO IS HOME TO MORE THAN 300 PROTECTED NONGAME BIRDS
An ethical hunter is a knowledgeable hunter.
It is unlawful to shoot or harass threatened, endangered, or protected nongame birds.

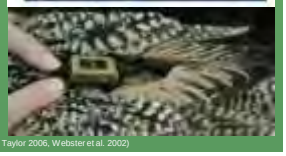
What's Happening Elsewhere?

- Many breeding season threats are occurring in southwestern Idaho but:
  - Similar threats in other breeding areas?
  - Where do curlews spend rest of annual cycle? Other threats outside of breeding season?

Full Annual Cycle Research

Events occurring throughout annual cycle are inextricably linked, and affect wildlife at the individual and/or population level

Made possible by advances in:
- Genoscape mapping
- Stable isotope analyses
- Transmitter technology



Conservation Implications
- Identify population-specific threats
- Carry-over effects
- Giving context to seasonal 'snapshots'

(Marra et al. 2015, Ruegg et al. 2014, Norris and Marra 2007, Norris and Taylor 2006, Webster et al. 2002)

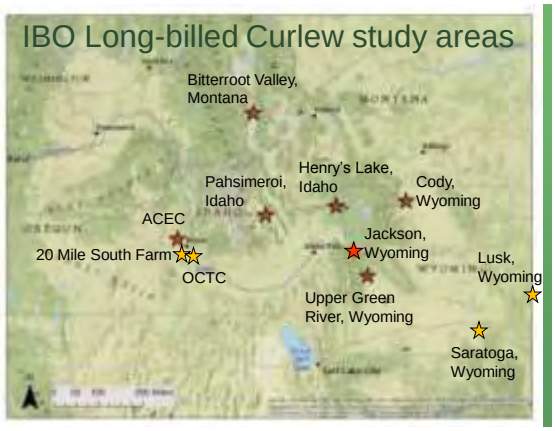
2013-2018

- Study limits to reproductive success (9 sites across 3 states)
  - Range of habitats: pastures, spring-fed meadows, dry grassland, low sage/grassland, agriculture
  - Gradients of human disturbance & predator communities

Source vs. sink habitats?

- Track curlews from Intermountain West (western North America) with satellite transmitters
  - Idaho, Montana, & Wyoming; British Columbia in 2017
- Non-breeding season habitat use

IBO Long-billed Curlew study areas



Stephanie Coates thesis

Objective 1: Examine limitations to nesting success in varied Intermountain West breeding habitats.*

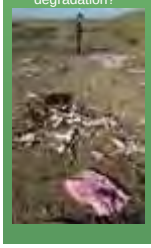
Objective 2: Determine spatial distribution and site fidelity in wintering ground destinations.

* Now accepted for publication: Coates, S. E., B. W. Wright, and J. D. Carlisle. *In press*. **Long-billed Curlew Nest Site Selection and Success in the Intermountain West.** *Journal of Wildlife Management*.

Breeding Grounds: ACEC Background

Breeding Grounds Which factors influence nesting success?

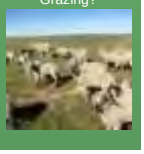
Habitat type & degradation?



Anthropogenic Disturbances?

Predators?

Grazing?



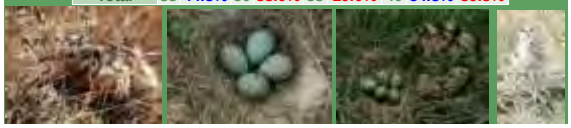
Breeding Grounds: Field Methods

- https://www.youtube.com/watch?v=6ySvg1zLGac

Breeding Season Results

2015-2018 nesting results

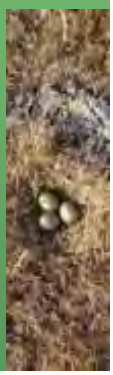
SITE	2015 n	2015 % hatch	2016 n	2016 % hatch	2017 n	2017 % hatch	2018 n	2018 % hatch	Overall %
ACEC	26	23.1%	24	33.3%	10	20.0%	1	n/a	26.7%
OCTC	-	-	2	0.0%	10	30.0%	16	56.3%	42.9%
20 Mile South Farm	-	-	-	-	8	50.0%	6	16.7%	35.7%
Pahsimeroi	17	58.8%	17	58.8%	13	7.7%	2	n/a	44.7%
Island Park	11	45.5%	-	-	-	-	4	n/a	45.5%
Green River	30	46.7%	-	-	28	17.9%	-	-	32.8%
Jackson	-	-	7	14.3%	11	54.5%	2	n/a	38.8%
Cody	3	100%	-	-	-	-	9	77.8%	83.3%
MPG Ranch	1	100%	-	-	3	100.0%	-	-	100.0%
Total	88	44.3%	50	38.0%	83	29.0%	40	54.8%	39.3%



Nest Habitat Selection

Nest Sites vs. Available Sites

- Nest sites **~6x more likely to have a cow pie within 50cm**



Parameter estimates (β), standard errors, and 85% confidence intervals from top-ranked conditional logistic regression model of nest site selection by long-billed curlews.

Parameter	β	SE	85% CI	p-value
Cow Pie within 50cm	5.95	0.25	4.125 to 8.581	<0.0001*
Effective Visible Height	-0.96	0.01	0.971 to 0.941	<0.0001*
% Bare Ground	-0.96	0.02	0.936 to 0.986	<0.05*
% Grass	-0.98	0.01	0.965 to 0.989	<0.05*
% Shrub	-0.52	0.65	0.203 to 1.306	<0.05*


2018 LBCU Nest Searching Areas
20 Mile South Farm and
Pleasant Valley Road
Cinder Cone Butte

Migratory Connectivity and Wintering Grounds: Background

Page et al. 2014

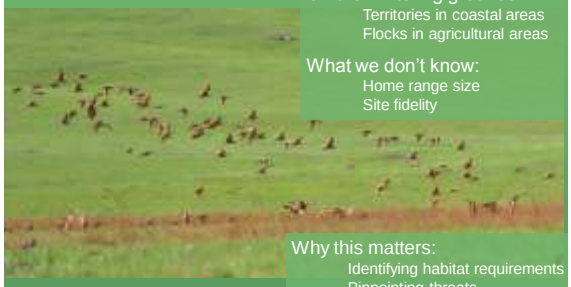
Migratory Connectivity and Wintering Grounds

Page et al. 2014

Wintering Grounds: Background

On the wintering grounds…
- Territories in coastal areas
- Flocks in agricultural areas

What we don't know:
- Home range size
- Site fidelity



Why this matters:
- Identifying habitat requirements
- Pinpointing threats
- Foundation for future studies

(Mathis et al. 2006, Leeman et al. 2001, Sesser 2013, Shuford 2013)

Migratory Connectivity and Wintering Grounds: Field Methods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Rhynchokinesis

Release video

https://ibo.boisestate.edu/curlewtracking/locations/

Also,

- http://birdscanada.org/research/speciesatrisk/index.jsp?targetpg=lbcu
- http://www.migratoryconnectivityproject.org/livetracks/ (many species, 2 curlew links below)
  - http://www.migratoryconnectivityproject.org/curlew-tx.html
  - http://www.migratoryconnectivityproject.org/lbcu-se.html

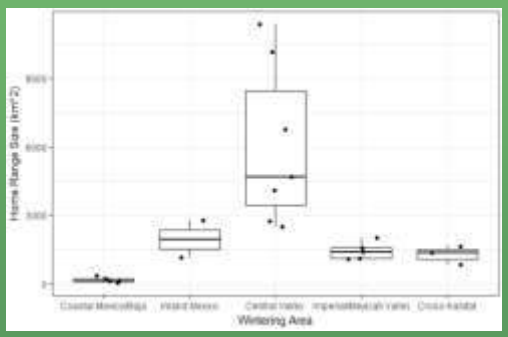

Bitterroot Valley's JV: Tour de Intermountain West


2014 - 2016 Migrations for CJ aka "Parking Lot Dave"


Breeding Ground "Detours" of JT and JN

Long-billed Curlew Migration
March 15-August 5, 2016

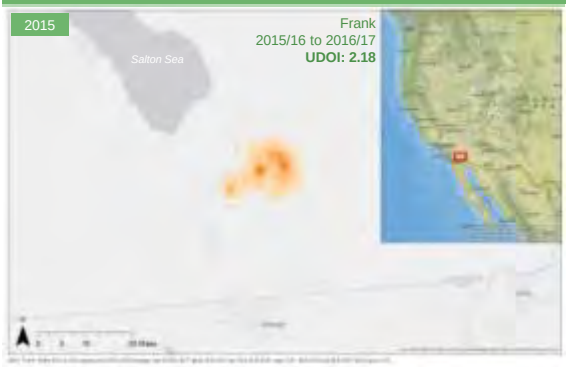
Wintering Grounds: Home Range Size



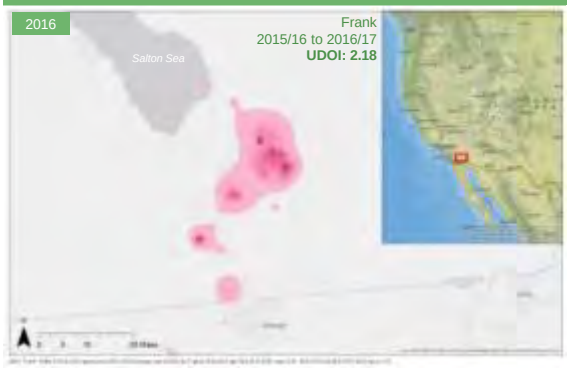
Movement in Different Wintering Areas

(R package 'moveVis'...thanks for the tip, Hannah!)

Wintering Grounds Site Fidelity

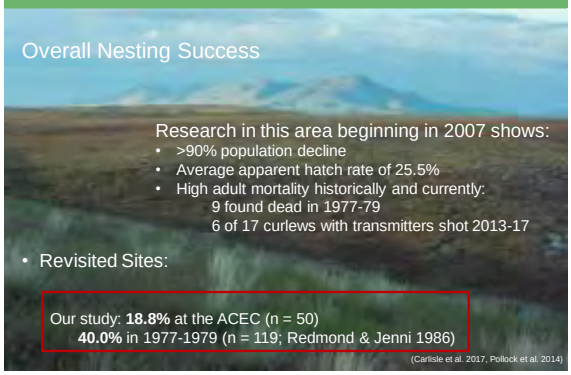


Wintering Grounds Site Fidelity

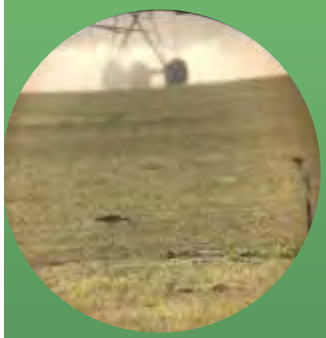


Discussion

Breeding Grounds: Discussion



Wintering Grounds: Discussion



Home Ranges and Core Use Areas

- Agricultural areas as a functional equivalent to lost wetland habitat, but may have risks
- Importance of flood irrigation and specific crops - alfalfa, rice
- Forage/resource-driven spatial distribution

(Kerstupp et al. 2015, Shuford et al. 2013, Sesser 2013, Elphick 2000)

Discussion: Resource-driven Spatial Distribution

Overall Conclusions

Potential for extinction lag with long-lived species

- First signs often local population decline
- Still needed: age structure of breeding populations

Targeted and adaptive management approaches

- Context-specific conservation efforts
- Still needed: full mapping of migratory connectivity

Conservation + Working Lands

Next Steps

- **Work with agencies, law enforcement, etc. to solve persistent shooting issue**
- **Add transmitters in population gaps to complete the connectivity "picture", e.g.:**
  - British Columbia, New Mexico breeders
  - California coast winterers
- **Winter habitat use & trends in land use**
  - International collaboration
- **Expand/intensify breeding work on working agricultural lands**

New PhD student (Madeline Aberg) in EEB program

"**The Social and Ecological Dynamics of Recreational Shooting on Public Lands**"

Will include human dimensions and ecological research

New sites in 2019:

Rio Mora NWR, New Mexico

North-central British Columbia (Ft. Saint James)

Mexicali Valley wintering – habitat use and behavior

Mexico pilot study - preliminary

- **Crop Type and Irrigation Method**
  - Flood irrigation – flocking & feeding once water turns on
    - especially alfalfa & wheat, sudan grass
  - Drip-line irrigation – seems to stay continually moist
    - especially asparagus (*also onion*)
  - Dry, recently-tilled or harvested fields
    - especially wheat or cotton
- **Threats**
  - Coyotes, raptors, shooters
- **Positive/Negative Association**
  - Of curlews, other birds to farmers

Financial Support and Study Site Access

USFWS, BLM, McDanel Land Foundation, Page Family Foundation, The Nature Conservancy (+TNC private donors), MPG Ranch, Meg and Bert Raynes Wildlife Fund, WGFD, CDFW, WGBGLC, Dan Montgomery GSA, 66 people through RocketHub crowdfunding

40+ private landowners in the Daniel, WY area

Other Key Partners

Idaho Department of Fish & Game

Intermountain West Joint Venture, American Bird Conservancy

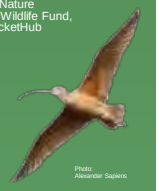
USGS and OSU (genetics and contaminants)

Idaho Army National Guard - OCTC

Fieldwork, etc.

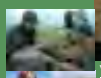
The Curlew Crews of 2009-2018 and many volunteers!

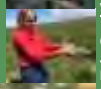
IBO: Rob Miller, Jessica Pollock

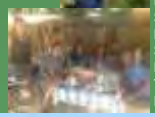


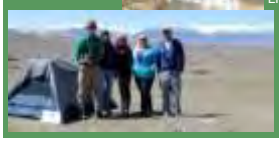
Technicians (2015 and/or 2016)

Erica Gaeta (2+ yrs)
Mikie Mcdonnell (2+ yrs)
Sarah Norton (2+ yrs)
Kevin Coates
Mikki Brinkmeyer
Hattie Inman
Jeremy Trussa
Eric Madsen
Jeremy Halka
Zak Pohlen









Volunteers

CJ Earl
Jessica Higley
Emma Gregory
Sadie Larsen
Morgan Graham
Sarah Ramirez
Dave and Carol Wike
Tammy Marr
Liana Cabiles

Technicians (2017-18)

Joni Clapsadle
Madeline Voshell
Rebecca Bracken
Ben West
James Laux
Eugenia Senties