

Apache Cicada

(Diceroprocta apache)



A Locally Abundant Bird Fare

What constitutes suitable cuckoo breeding habitat?



- Patch Size
- Microclimate Characteristics
- Vegetation Structure
- Prey availability

Eastern populations of the Yellow-billed Cuckoo have been shown to respond to fluctuations in periodical cicada numbers (Koenig and Liebhold 2005).

Do fluctuations in cicada populations affect Yellow-billed Cuckoo numbers within the lower Colorado River watershed?



Methods

- **Live Cicada Counts**

An index of the number of cicadas detected at each survey point was recorded during surveys.

- **Cicada Exuviae Counts**

Apache cicada nymphs emerge from the soil, and shed their nymphal exoskeleton (exuviae) on or near the ground.



Cicada exuviae

Results

LIVE CICADA COUNTS

- Data show cuckoo detections peak approximately three weeks before cicada counts do.

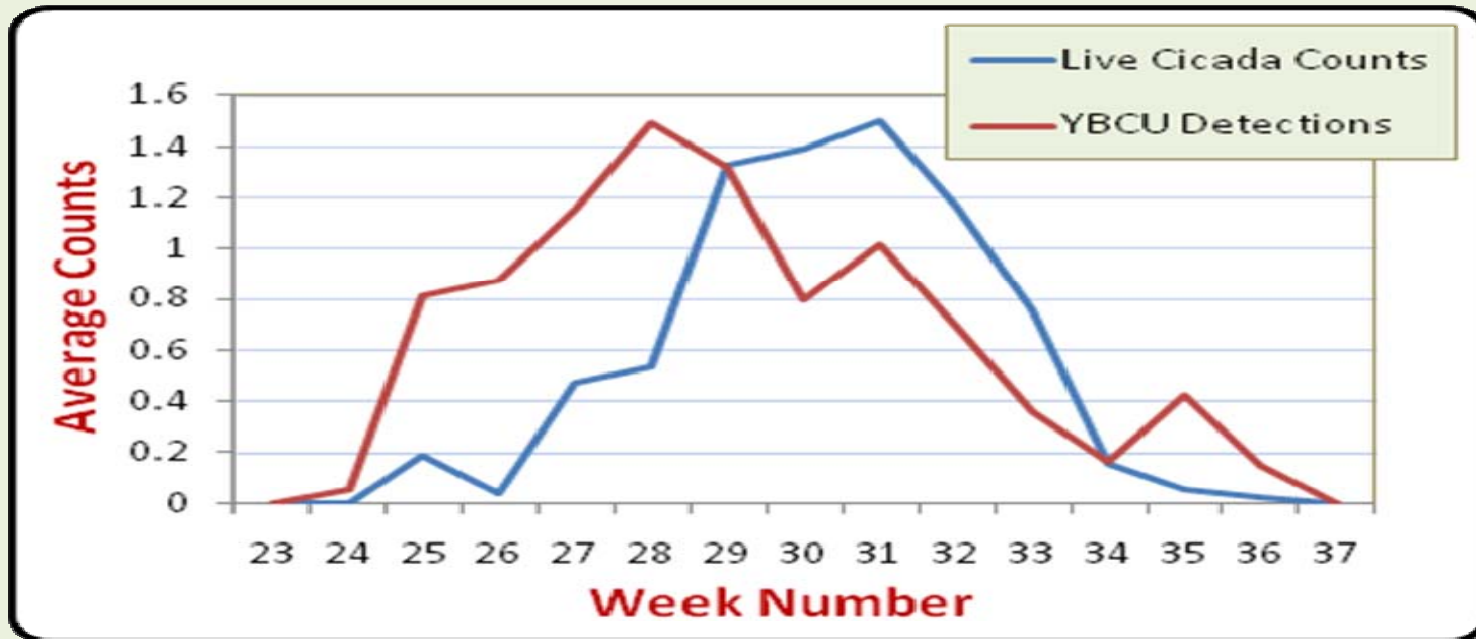


Figure 1 2007-2009 average live cicada counts and YBCU survey detections by week.

Results

LIVE CICADA COUNTS (cont.)

- Live cicada count data suggests a weak to moderate dependence of cuckoo detections on cicada numbers. This relationship was weaker for Restoration sites.

Table 1 Chi² test statistics for cuckoo occupancy dependence on live cicada counts (2007-2009 data).

	χ^2	P	λ
Natural Sites	348.916	<0.001	0.075
Restoration Sites	58.939	<0.001	0.026
Combined	168.114	<0.001	0.024

Results

CICADA EXUVIAE COUNTS

- Exuviae counts show a positive correlation with cuckoo detections at natural sites for both 2008 and 2009 data.
- Restoration sites did not show this correlation.

Table 2 Correlation (r^2) results and sample size (n) for the response of YBCU detections to cicada exuviae counts.

	Natural	Restoration	Combined
2008	$r^2=0.483$ (18)	$r^2=0.067$ (17)	$r^2=0.227$ (35)
2009	$r^2=0.541$ (26)	$r^2=0.05$ (21)	$r^2=0.259$ (47)

Summary

- Cuckoo detections peak approximately 3 weeks before the number of cicadas do.
- At natural sites cuckoo detections were effected by the number of cicadas detected.
- The relationship between cuckoo detections and cicada does not appear to exist at restoration sites.

A close-up photograph of a cicada nymph, a pale, segmented insect with long legs, partially buried in a hole it has dug into the sand. The sand is light-colored and textured. The nymph's head and front legs are visible as it emerges from the hole.

**What does this mean for
the cicada?**

**Be fast, it's a rough life for locally
abundant food resources!**

What does this mean for the cuckoo?

- Further evidence that cicadas are an important food resource for cuckoos within the region at least at some sites.
- Cuckoos may be exploiting different arthropod species at restoration sites than they are a natural sites.



Acknowledgements

- 2007 Data collected by the USGS
- A special thanks to refuge staff and land managers for logistical and permitting assistance.
- This work could not have been done without many dedicated technicians.
- Funding for this work was provided by the Bureau of Reclamation.

