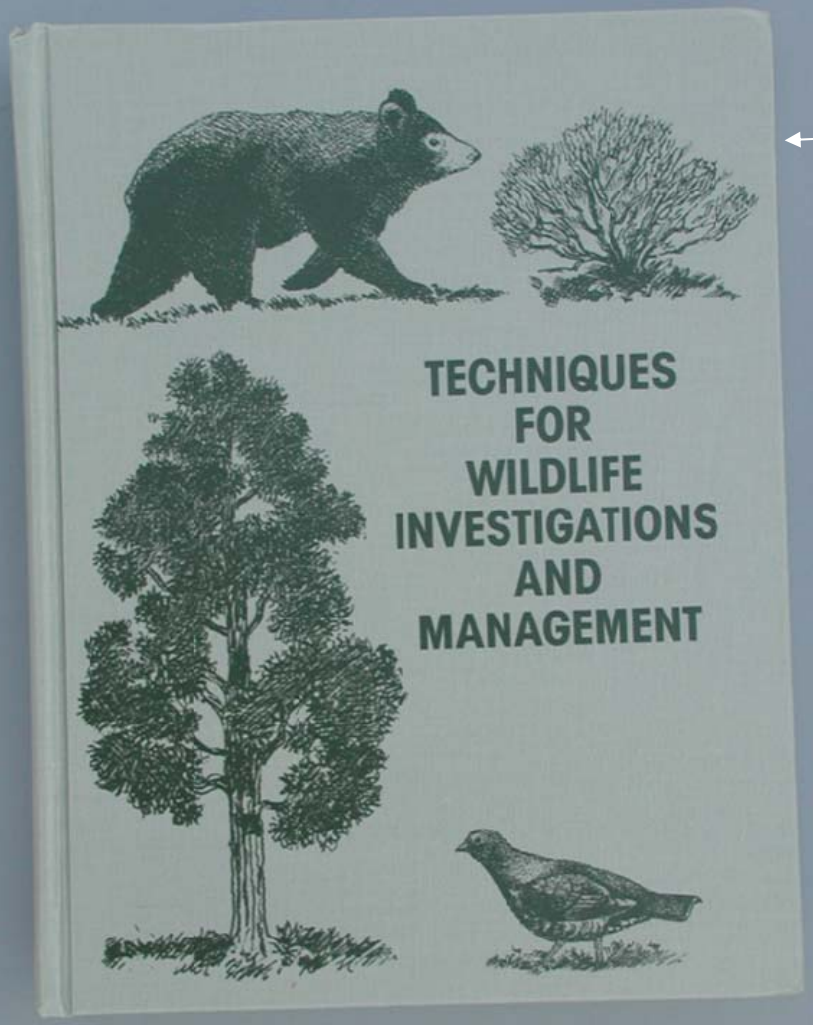
Radar 101 for Toledo conference

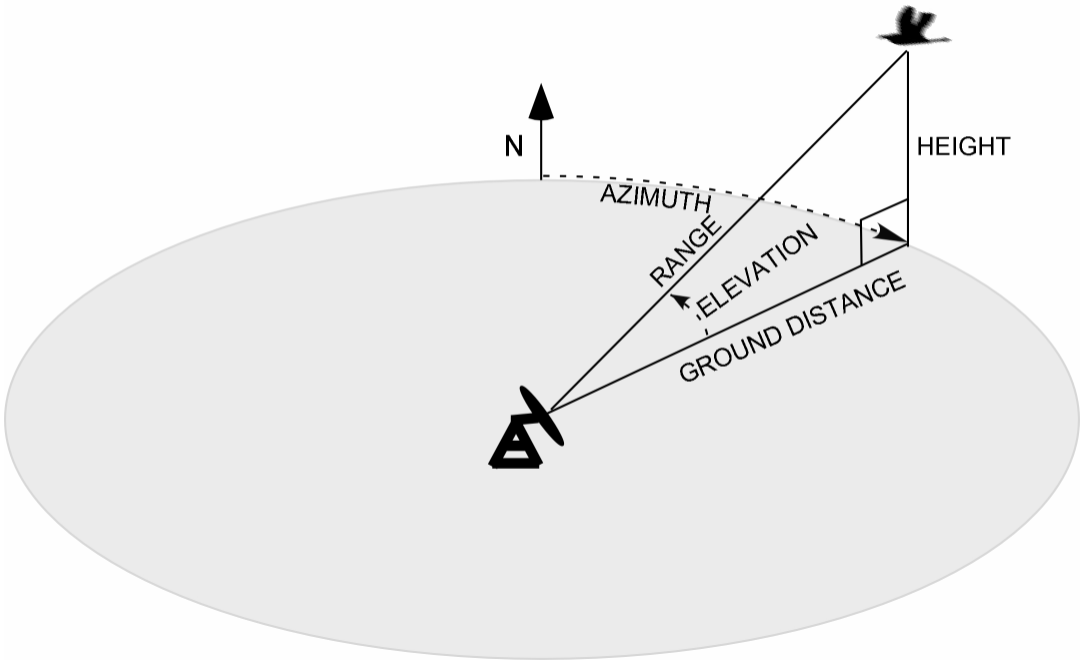
2006

Ronald P. Larkin
Wildlife Ecologist
Illinois Natural History Survey



Larkin, R.P. (2005) Radar techniques for wildlife biology. pages 448-464 *In:* C. E. Braun, editor. *Techniques for wildlife investigations and management, 6th Edition*. The Wildlife Society, Bethesda, Maryland, USA.

Diehl, R. H., and R. P. Larkin. (2005). Introduction to the WSR-88D (Nexrad) for ornithological research. Pages 876-888 in Ralph, C. J. and T. D. Rich, editors. *Bird Conservation Implementation and Integration in the Americas: Proceedings of the Third International Partners in Flight Conference.* U.S.D.A. Forest Service, Albany, California, USA.

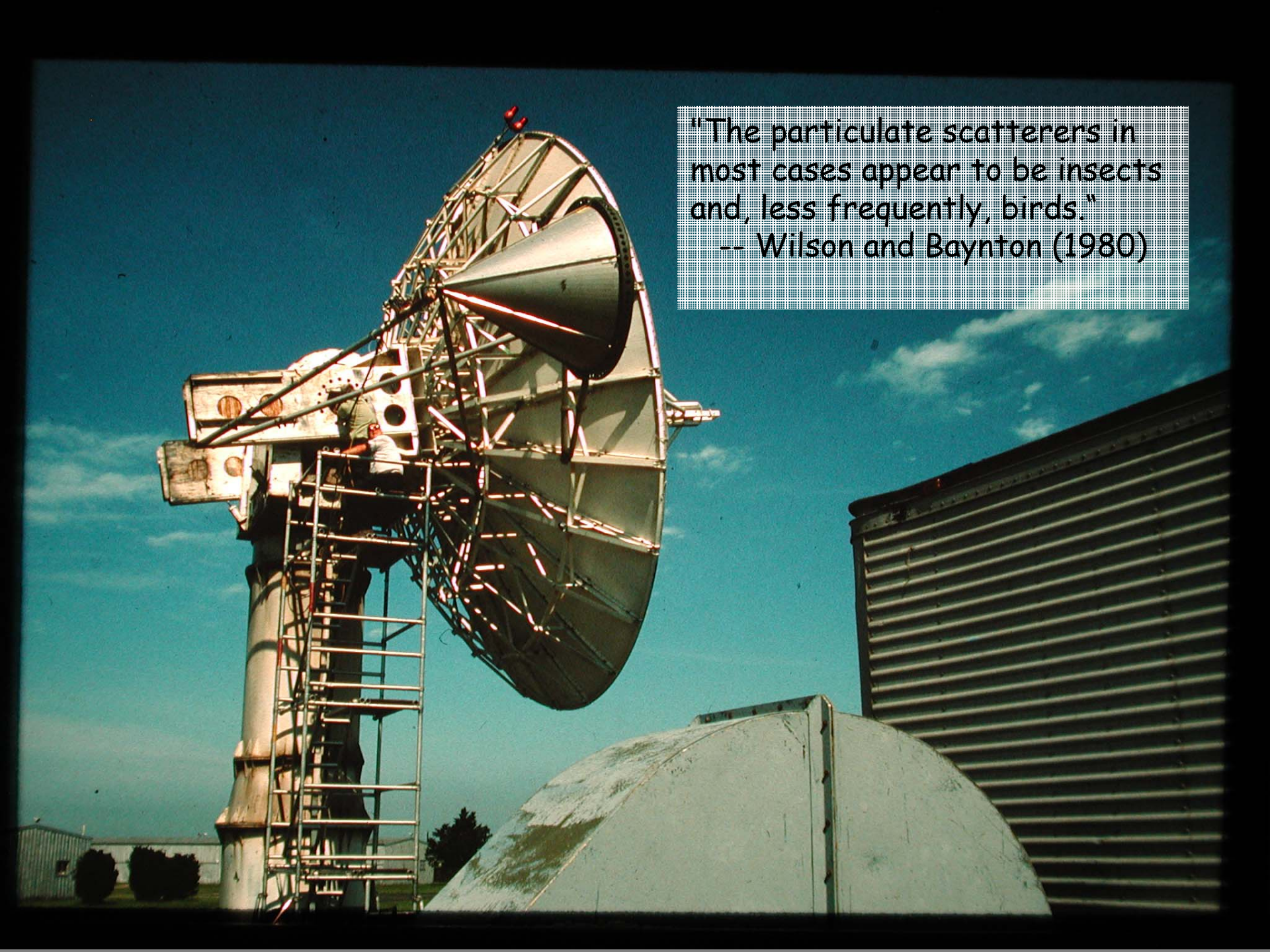


Large Doppler radar
Smaller radars
- marine radar (later today)
- stationary-beam radar
- tracking radar

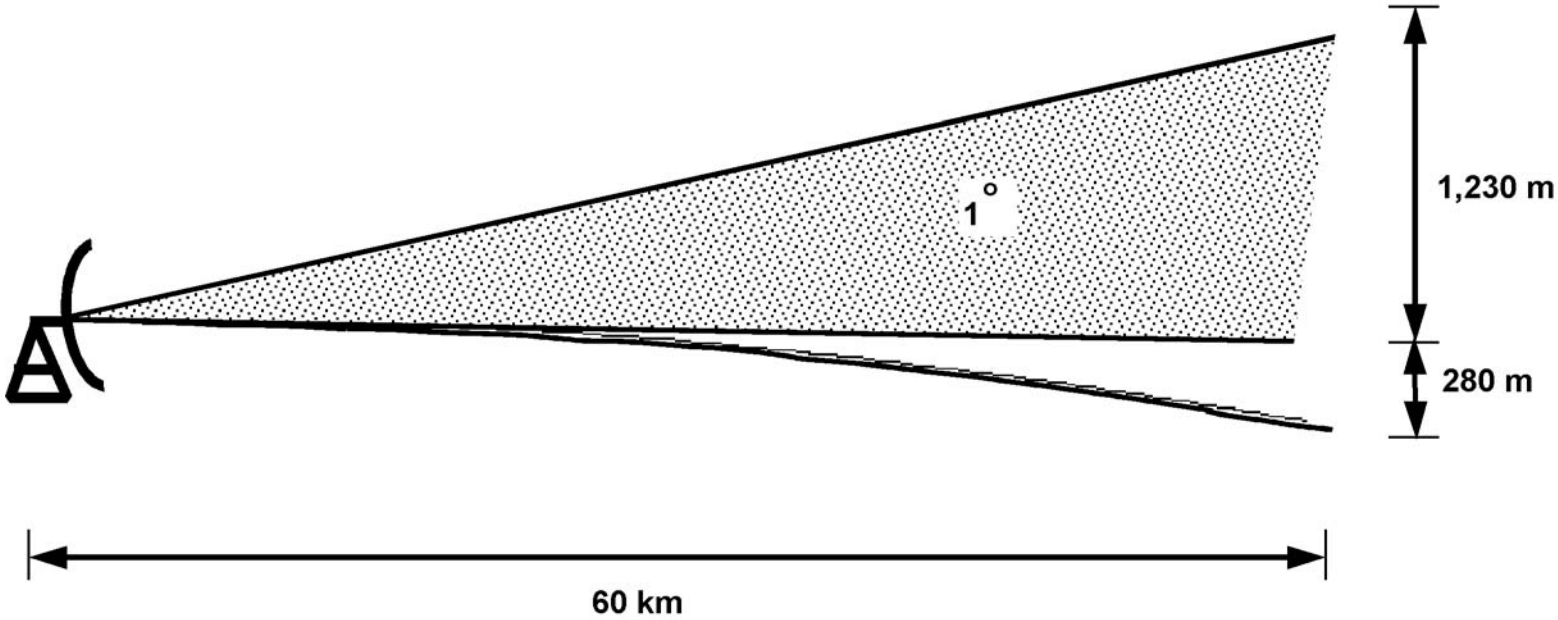
The graphic is adapted from: Larkin, R.P. (2005) Radar techniques for wildlife biology. pages 448-464 *In:* C. E. Braun, editor. *Techniques for wildlife investigations and management, 6th Edition*. The Wildlife Society, Bethesda, Maryland, USA

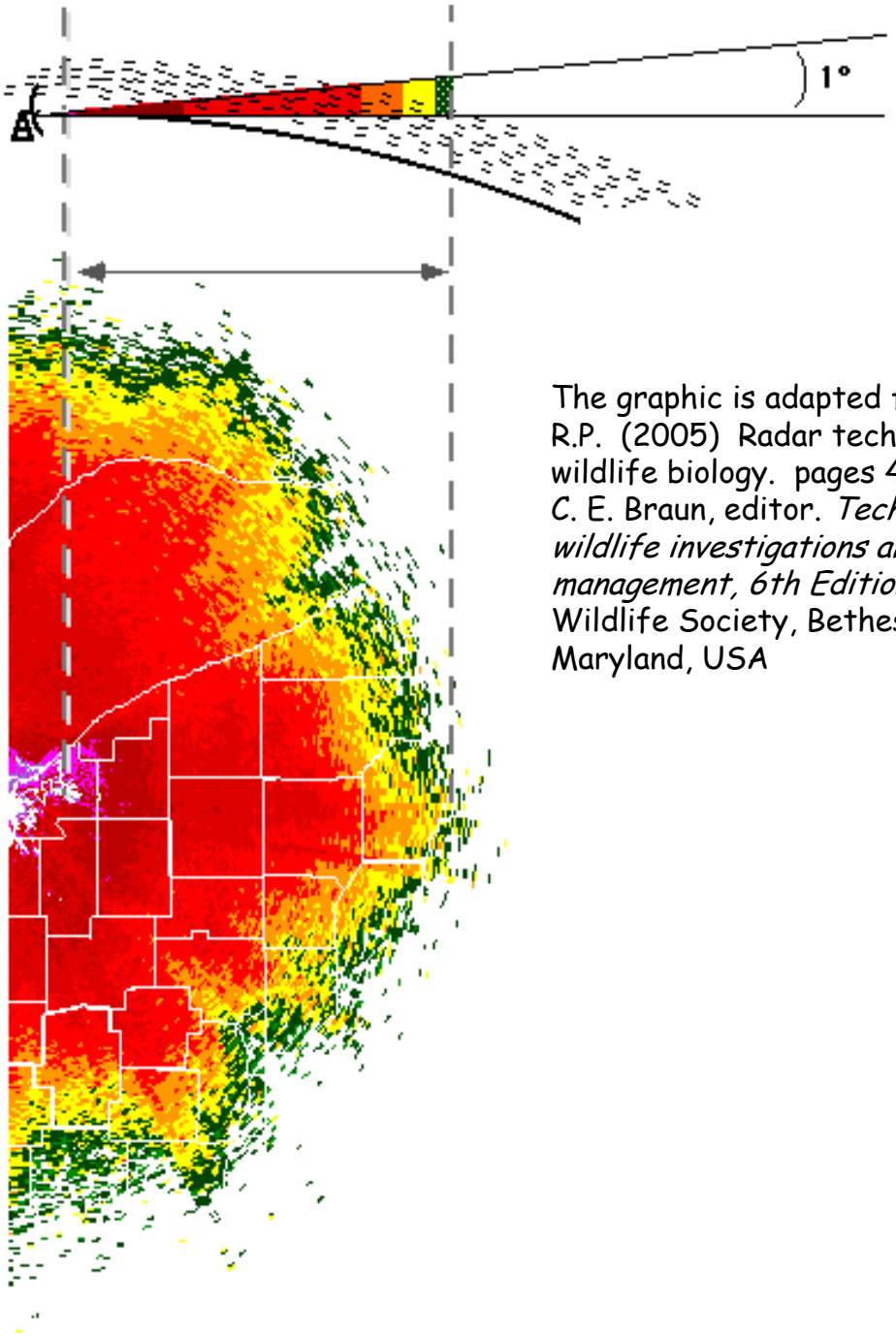
"Weather" radar

David Brunkow
Gene Mueller
National Science Foundation

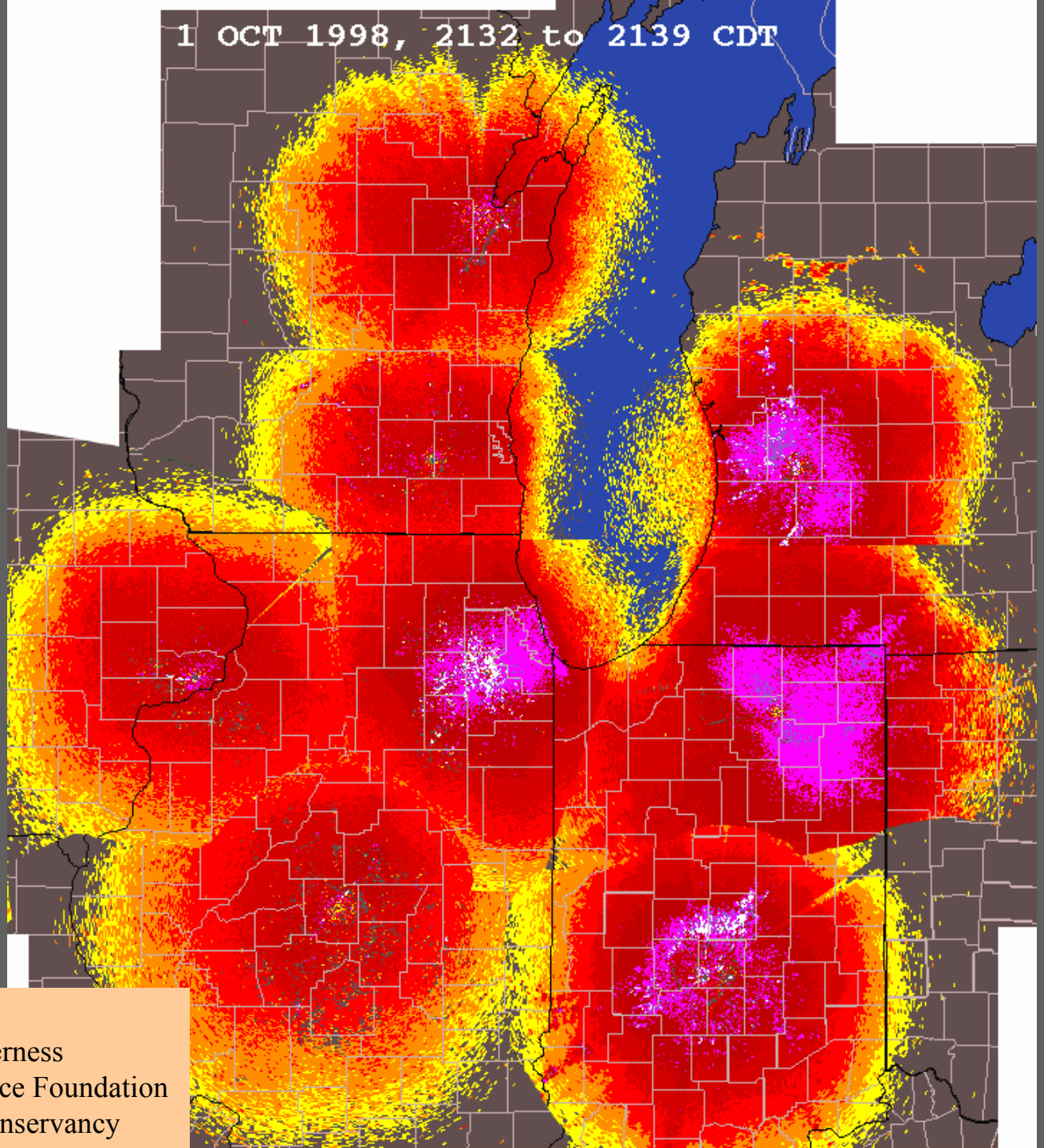


"The particulate scatterers in most cases appear to be insects and, less frequently, birds."
-- Wilson and Baynton (1980)

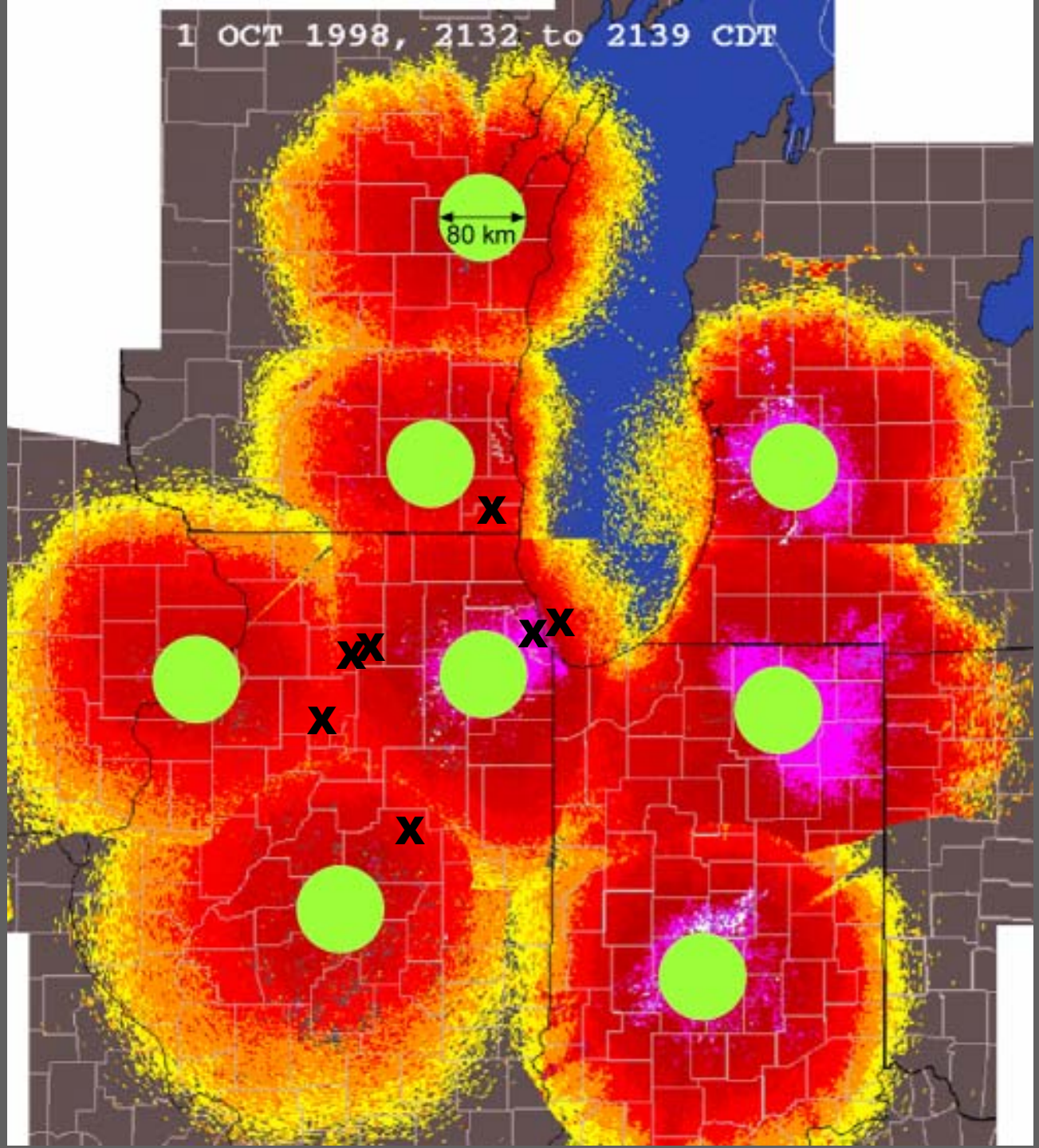

1°
1,230 m
280 m
60 km

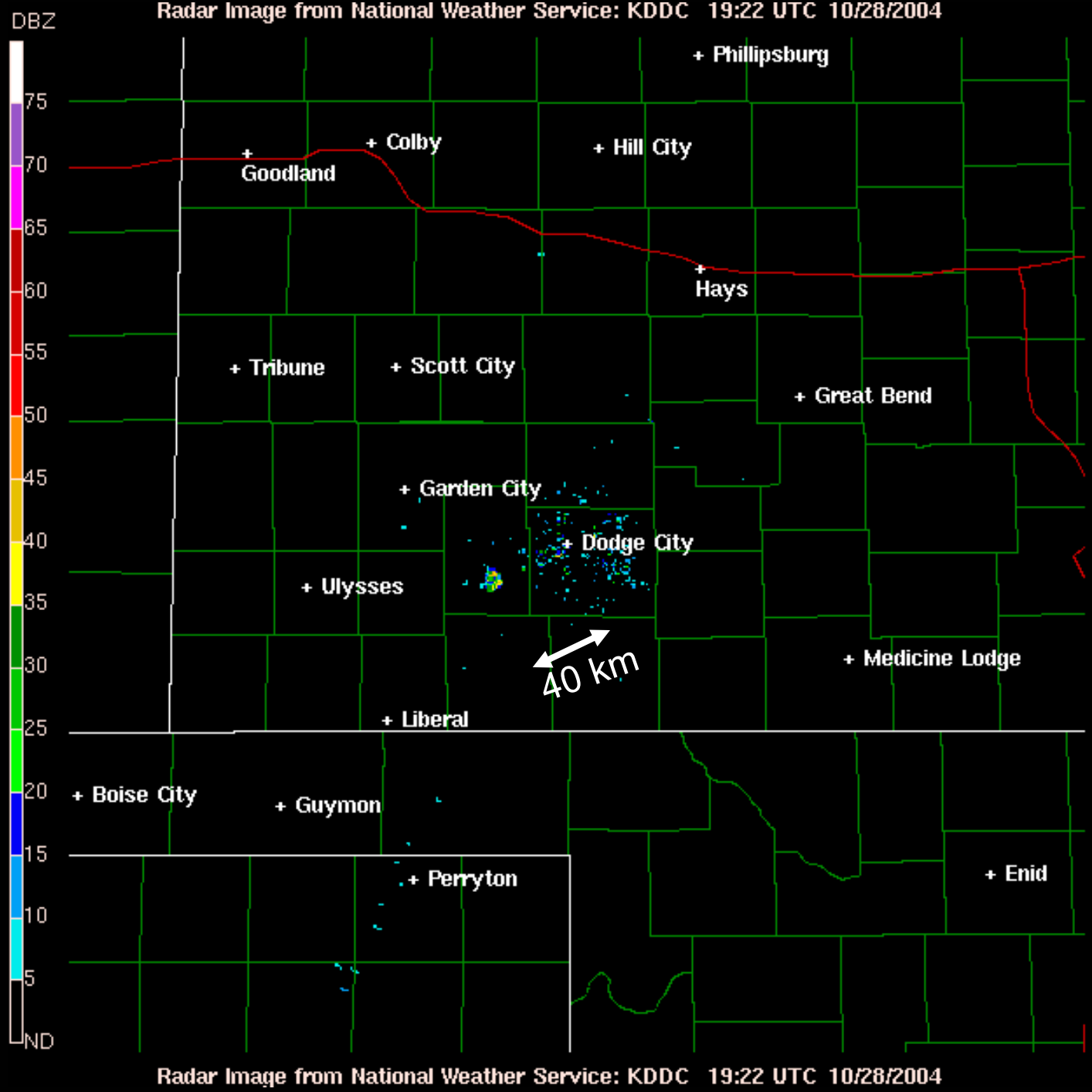


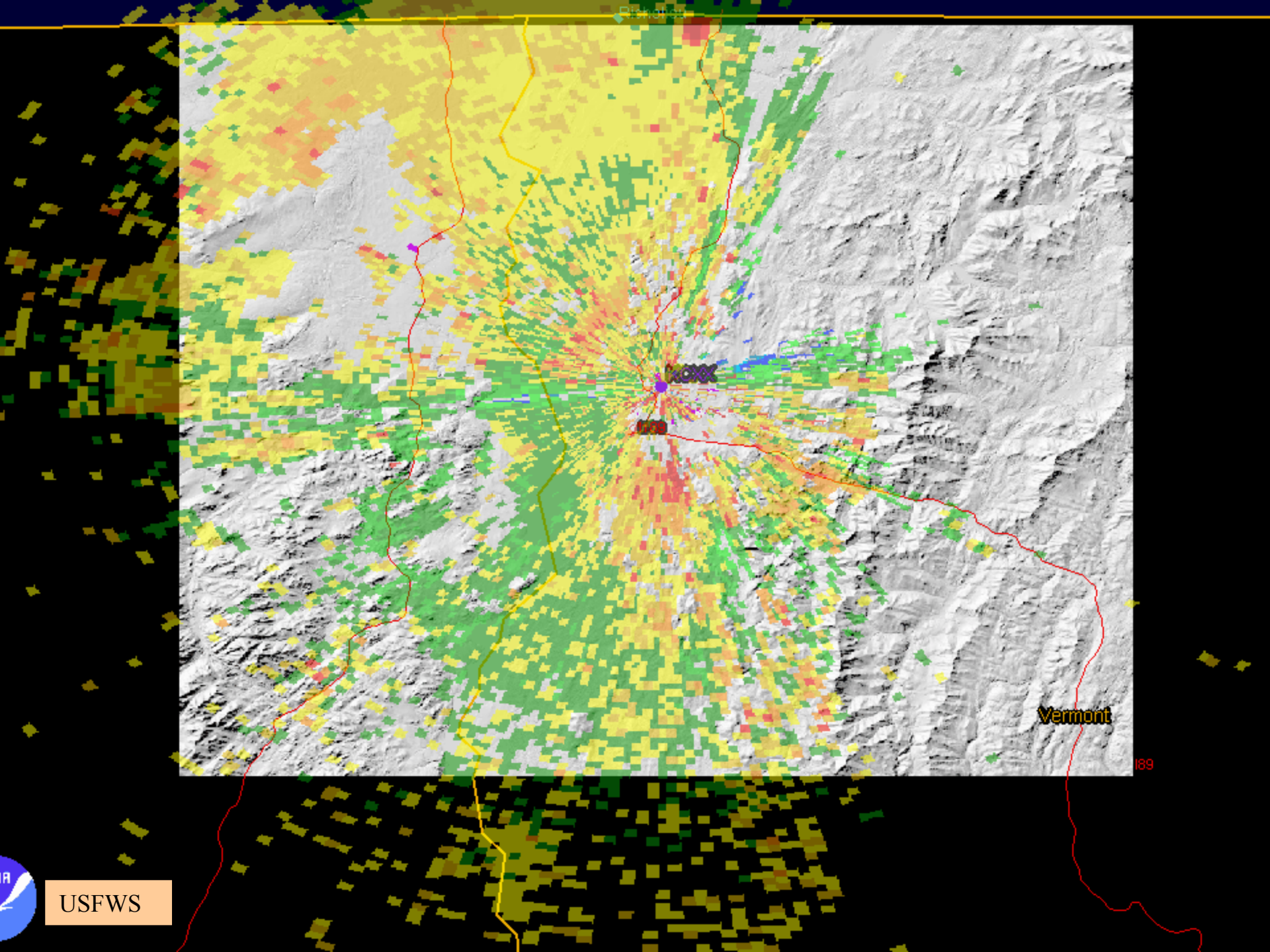
The graphic is adapted from: Larkin, R.P. (2005) Radar techniques for wildlife biology. pages 448-464 *In:* C. E. Braun, editor. *Techniques for wildlife investigations and management, 6th Edition*. The Wildlife Society, Bethesda, Maryland, USA



Robb Diehl
Chicago Wilderness
National Science Foundation
The Nature Conservancy


1 OCT 1998, 2132 to 2139 CDT
80 km

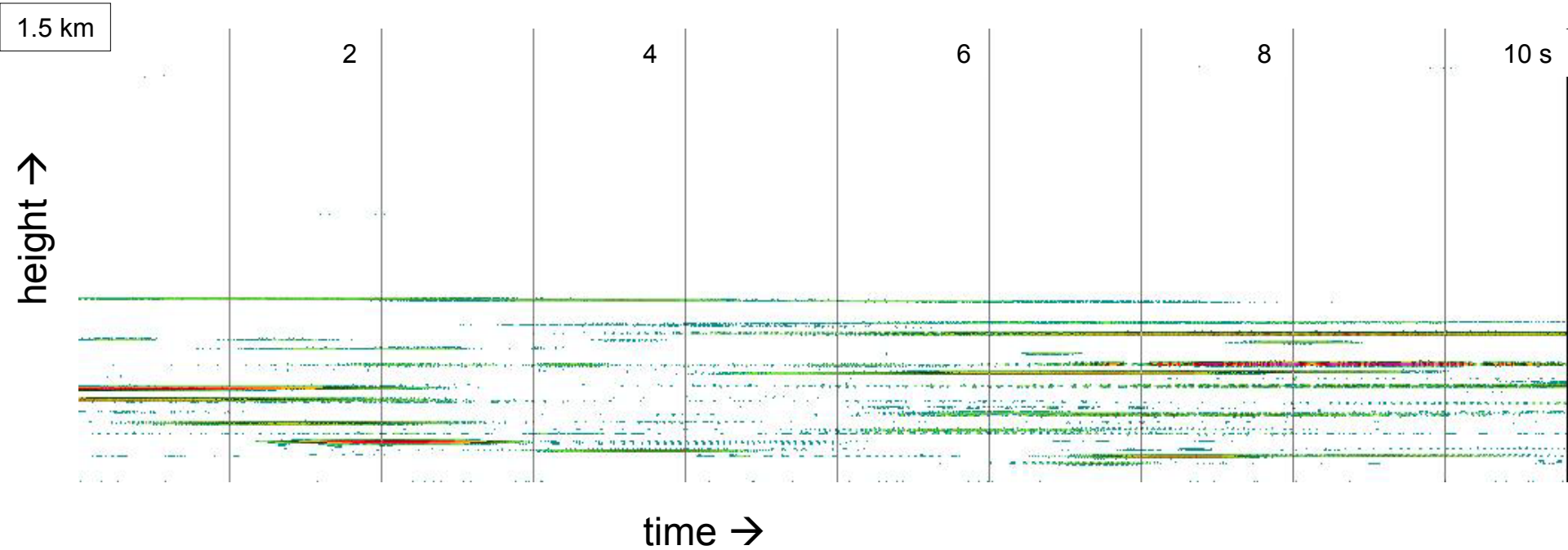

Radar Image from National Weather Service: KDDC 19:22 UTC 10/28/2004
DBZ
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
ND
Phillipsburg
Colby
Hill City
Goodland
Hays
Tribune
Scott City
Great Bend
Garden City
Dodge City
Ulysses
40 km
Medicine Lodge
Liberal
Boise City
Guymon
Perryton
Enid
Radar Image from National Weather Service: KDDC 19:22 UTC 10/28/2004



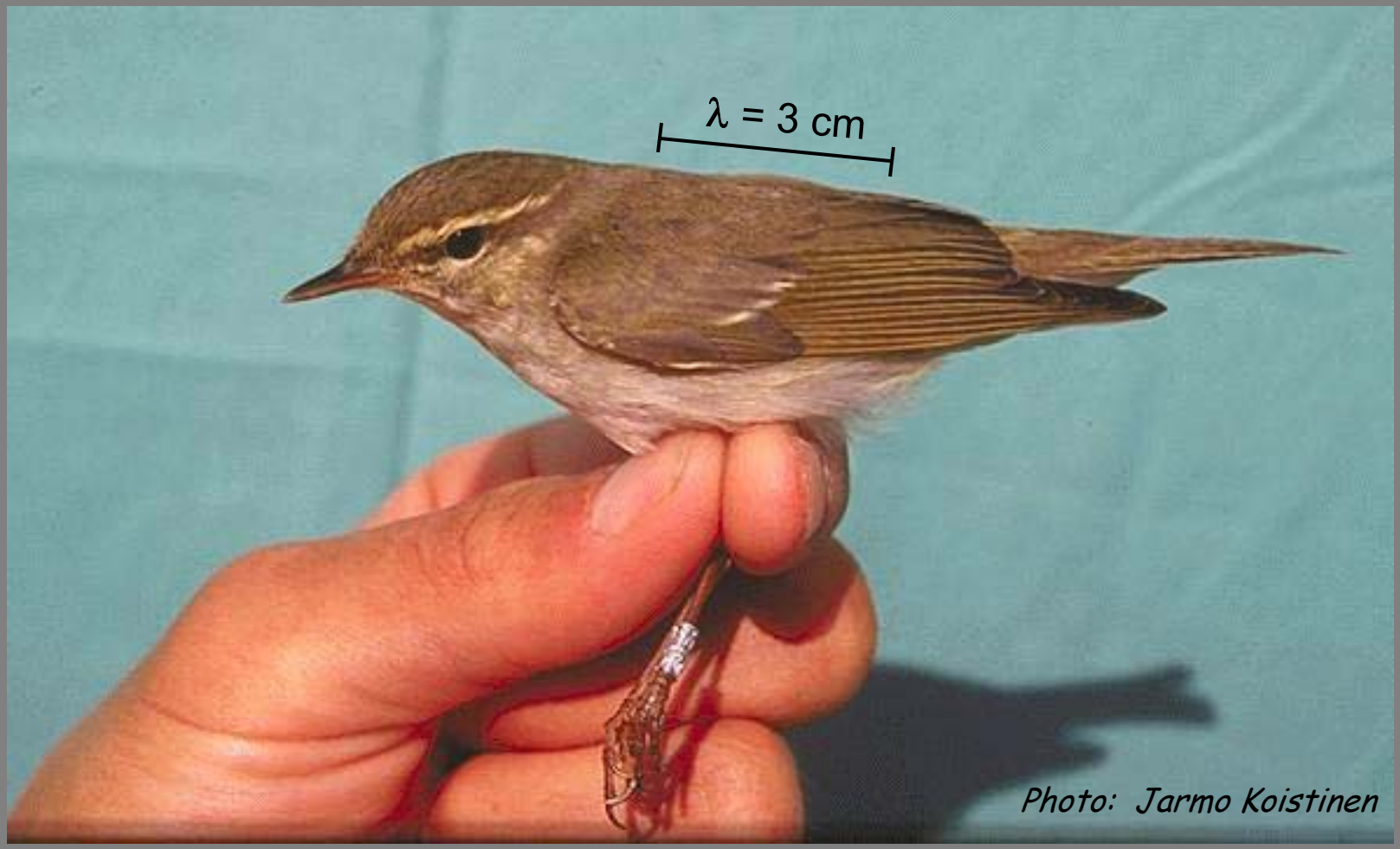
USFWS

Small radars, often based on X-band marine radar

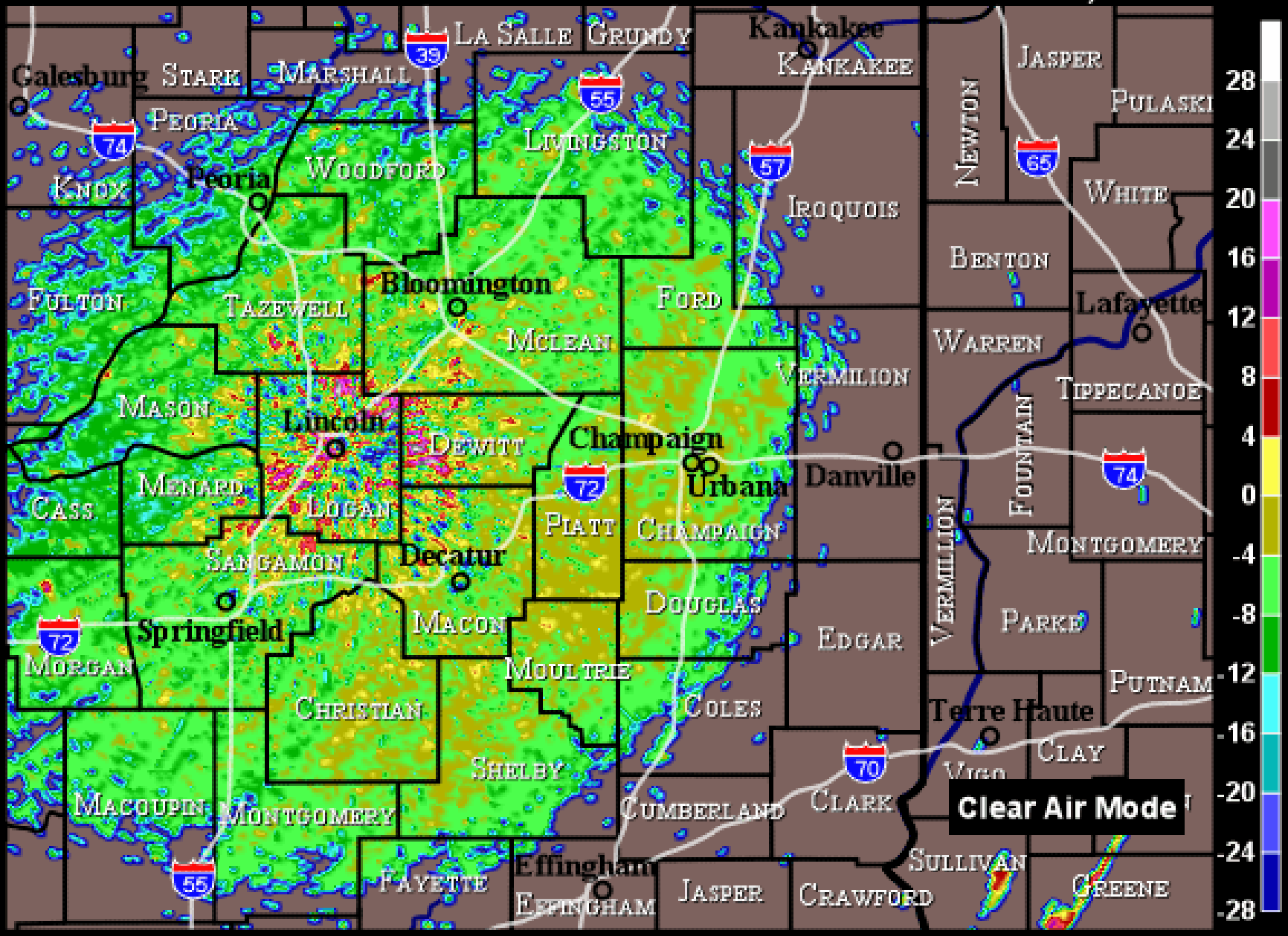
height of migration



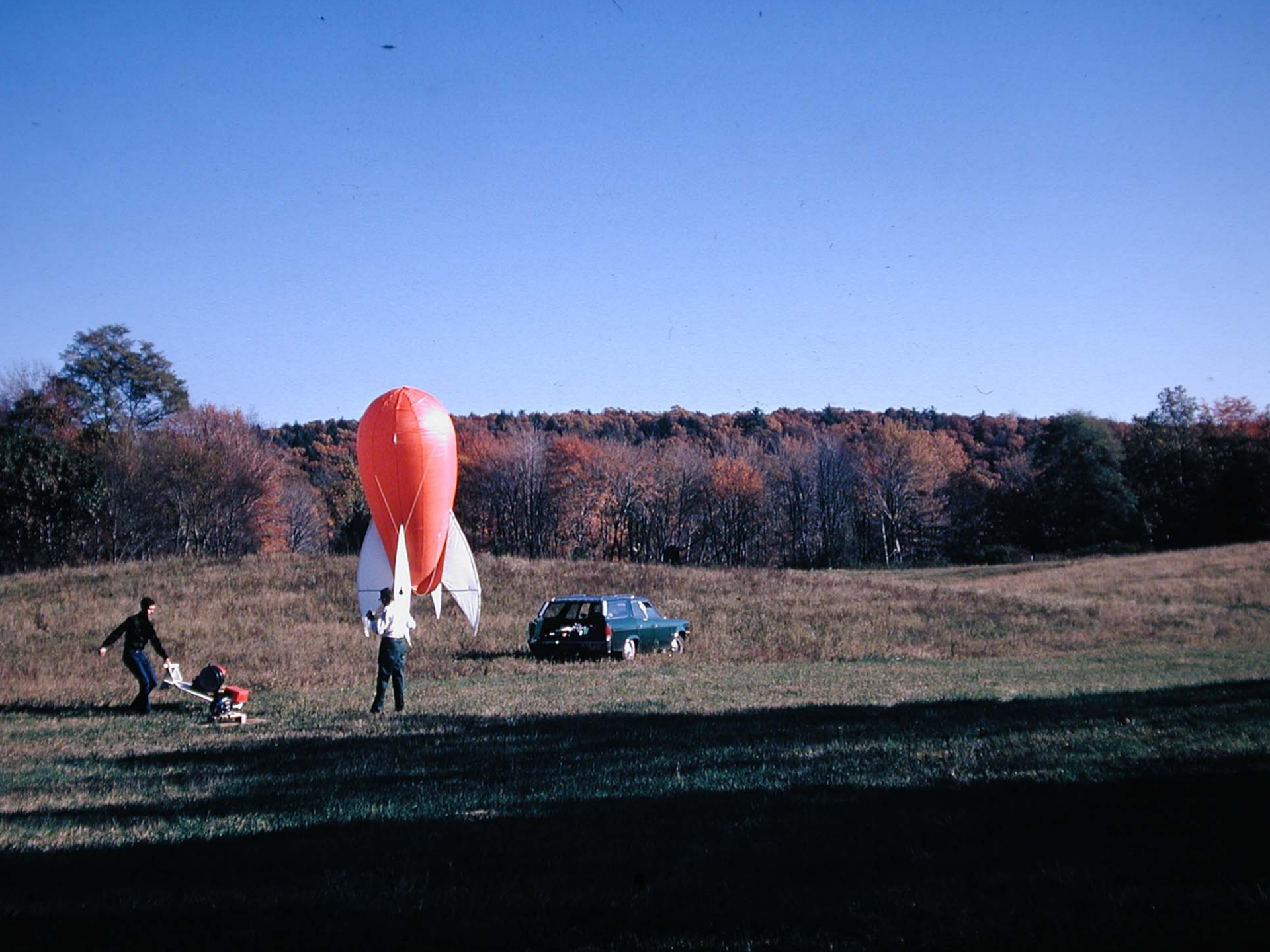
A nocturnal migrant



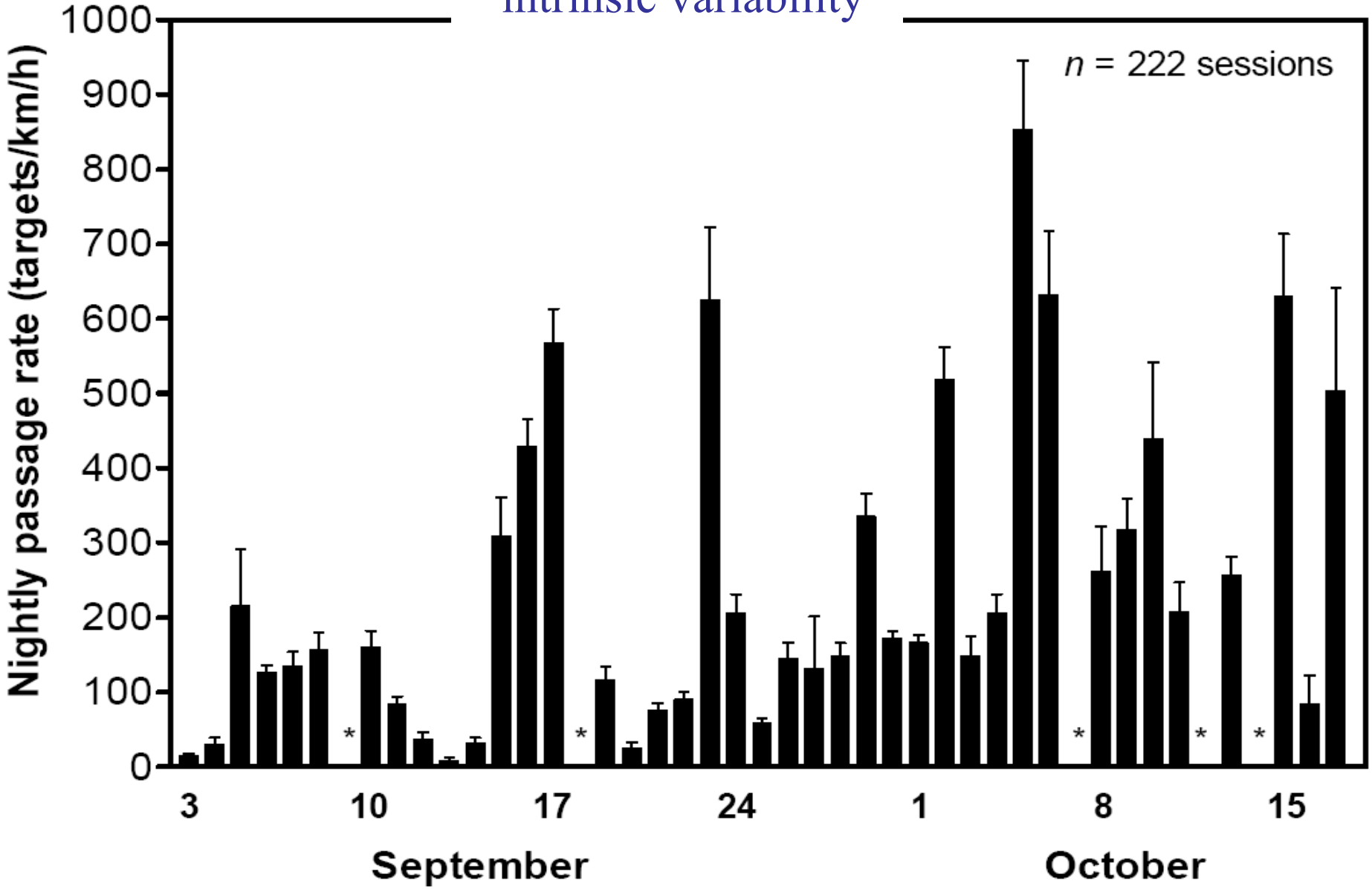
East Central Illinois Radar 11:15AM CST Fri Mar 31, 2006



Atmospheric Sciences, University of Illinois at Urbana-Champaign http://www.atmos.uiuc.edu/ [c]



intrinsic variability



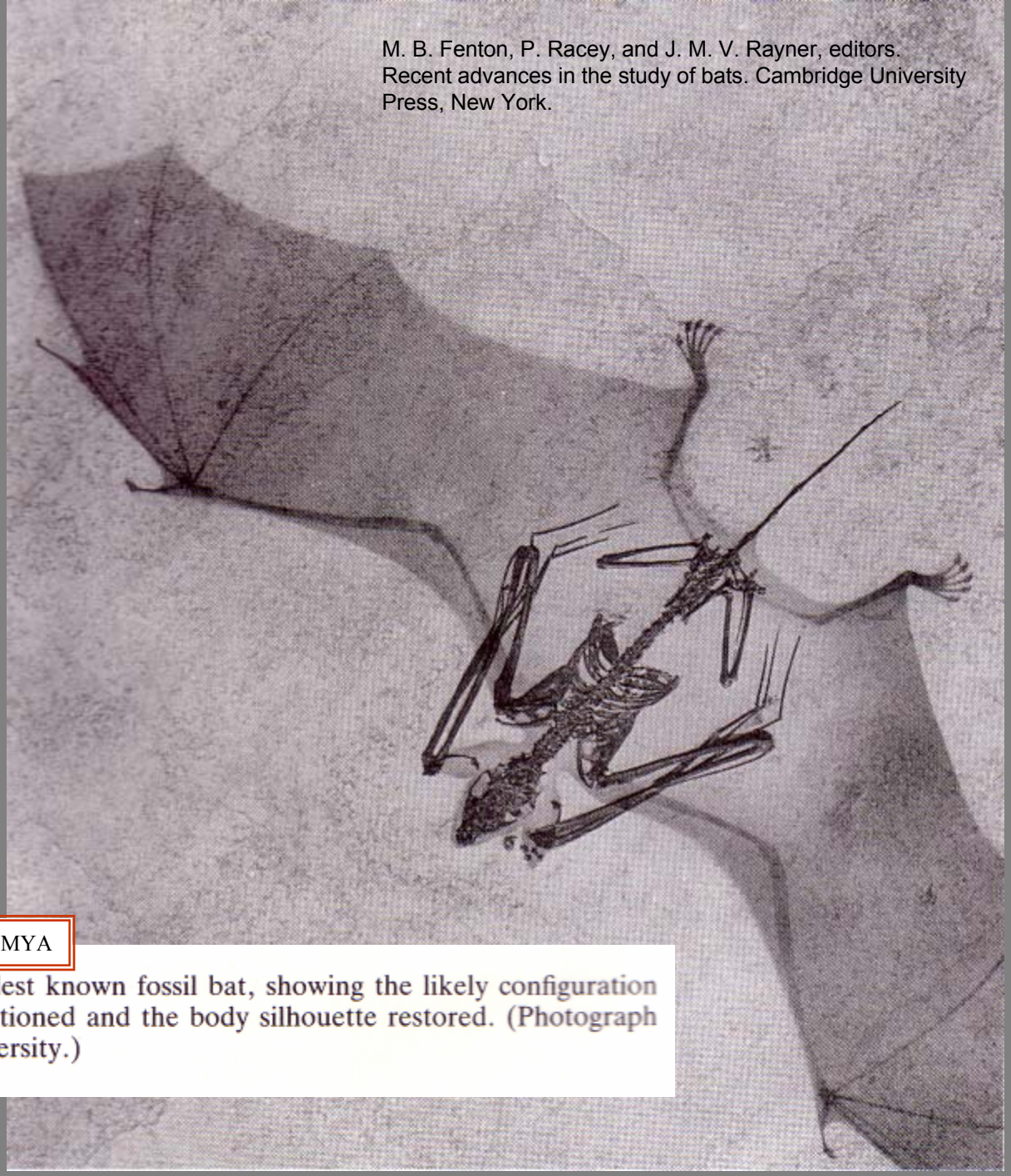
Radar-measured passage rates of vertebrates during one fall migration season at a site in West Virginia

Mabee, T. J., J. H. Plissner, B. A. Cooper, and D. P. Young. 2005 in press. Nocturnal bird migration over an Appalachian ridge at a proposed wind power project. *Wildlife Society Bulletin*, by permission

tracking radar

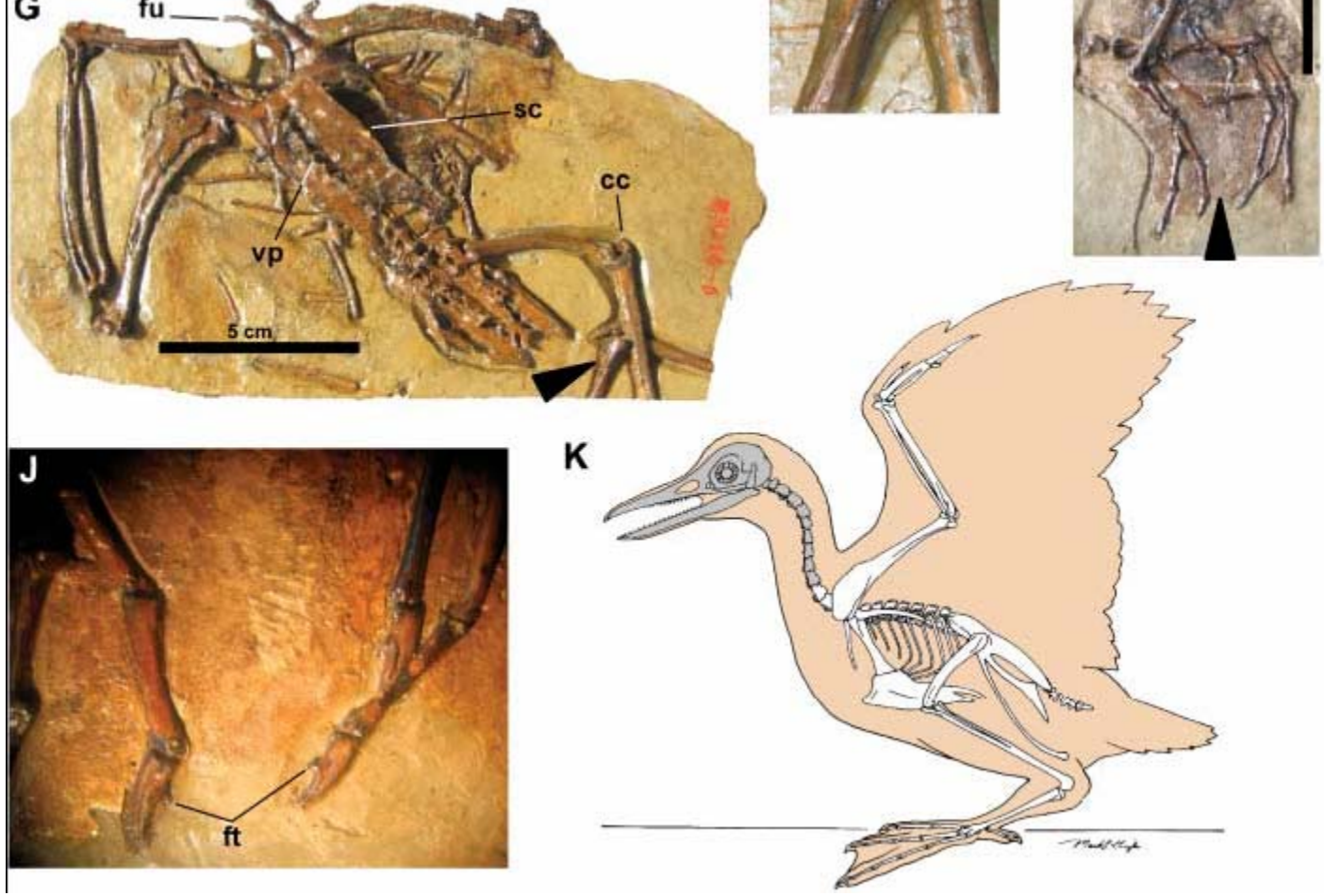
Agricultural Research Service
John Westbrook
George Swenson
Univeristy of Illinois Research Board

M. B. Fenton, P. Racey, and J. M. V. Rayner, editors. Recent advances in the study of bats. Cambridge University Press, New York.



30 MYA

Icaronycteris index, the oldest known fossil bat, showing the likely configuration with the wing bones repositioned and the body silhouette restored. (Photograph courtesy of Princeton University.)



Gansus yumenensis from 110 mya in China

Hai-lu You, Matthew C. Lamanna, Jerald D. Harris, Luis M. Chiappe, Jingmai O'Connor,Shu-an Ji, Jun-chang Lu, Chong-xi Yuan, Da-qing Li, Xing Zhang, Kenneth J. Lacovara, Peter Dodson, Qiang Ji, 2006