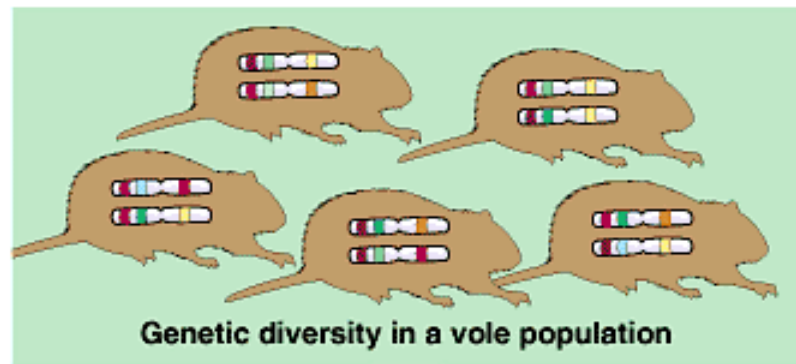




Fig 55.1









## Multiple levels of biodiversity



# Ecosystem services: Pollination



**Table 30.2 A Sampling of Medicines Derived from Plants**

| Compound     | Example of Source |   | Example of Use                 |
|--------------|-------------------|---|--------------------------------|
| Atropine     | Belladonna plant  |    | Pupil dilator in eye exams     |
| Digitalin    | Foxglove          |    | Heart medication               |
| Menthol      | Eucalyptus tree   |    | Ingredient in cough medicines  |
| Morphine     | Opium poppy       |    | Pain reliever                  |
| Quinine      | Quinine tree      |    | Malaria preventive             |
| Taxol        | Pacific yew       |   | Ovarian cancer drug            |
| Tubocurarine | Curare tree       |  | Muscle relaxant during surgery |
| Vinblastine  | Periwinkle        |  | Leukemia drug                  |

Source: Adapted from Randy Moore et al., *Botany*, 2nd ed. Dubuque, IA: Brown, 1998. Table 2.2, p. 37.

**Of the top 150  
prescription drugs in US:**

**74% from Plants**

**18% from Fungi**

**5% from Bacteria**

**3% from Snakes**



Fig 55.3

## Ecosystem services: Drugs



# Ecosystem services: Flood control



## Ecosystem services: Erosion control





# When ecosystem services fail



Photo A. Gutierrez, <http://www.honduras.com/archive-photos/ag-nov98/disk06/mvc011f.jpg>



## Ecosystem services: Clean air

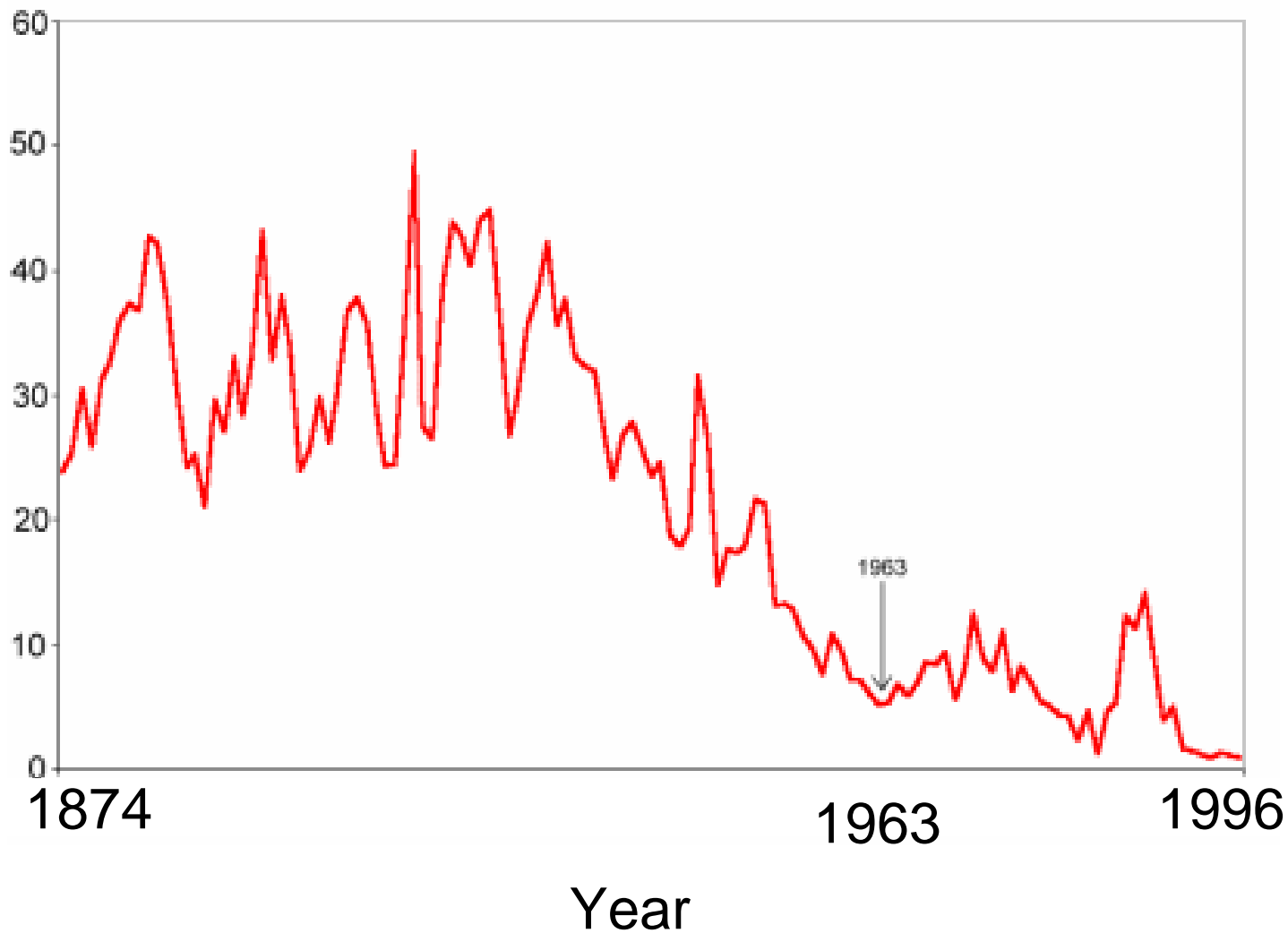


# Biophilia



Benjamin  
Cummings

Salmon  
in  
Columbia  
River  
(millions  
of  
pounds)





# Great Auk, 1844.



Cause: hunting.



# Passenger pigeon, 1914

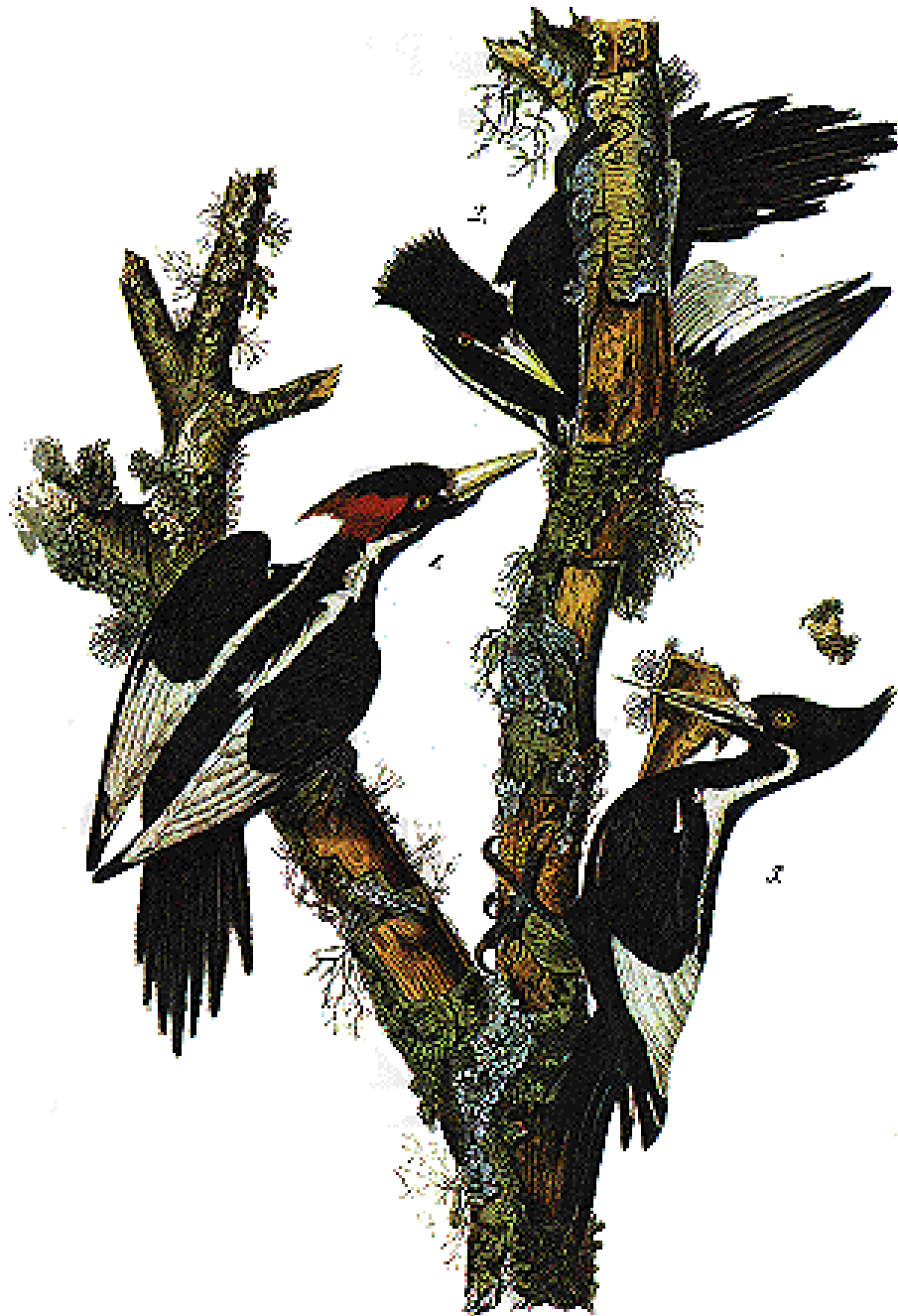
Cause: hunting,  
habitat loss.

# Carolina Parakeet, 1935



Cause: hunting, habitat loss.





Ivory-billed  
woodpecker, 1940

Cause:  
habitat loss.

The Ivory-billed Woodpecker

# Dusky Seaside Sparrow, 1987



Cause: habitat loss.

Last captive birds died at Disney World.

# California Condor, 1983



<http://www.lanecc.edu/science/russin.htm>

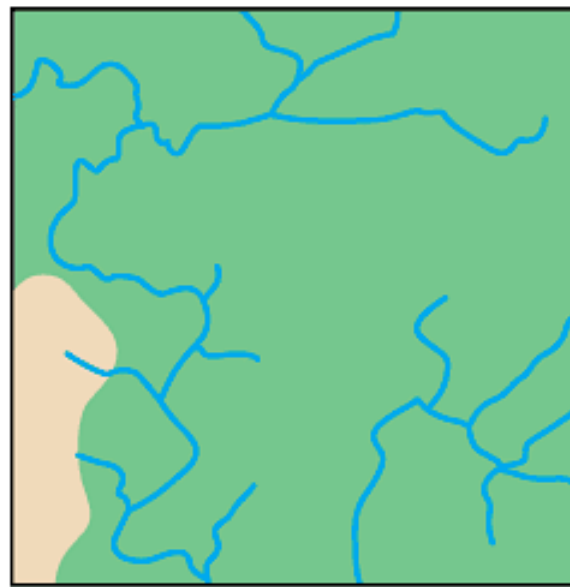
Cause: habitat loss, hunting.  
20 remaining wild birds captured.



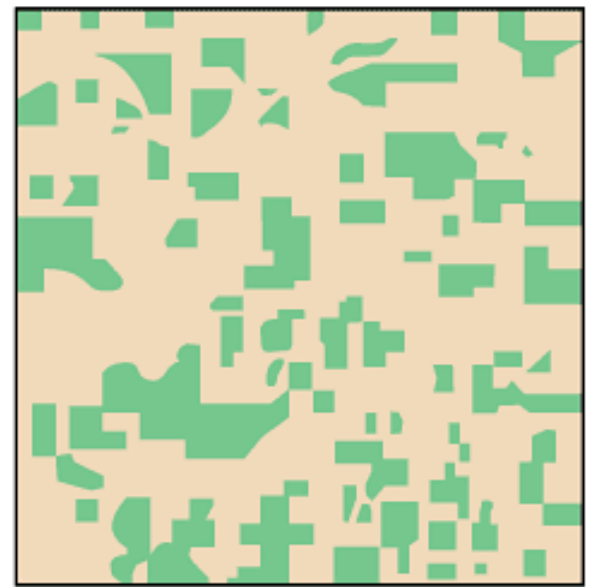


Fig 55.6

Forest cover of  
Cadiz Township in  
Wisconsin



1831



1882



1902



1950



Fig. 53.25 Species number increases with habitat area

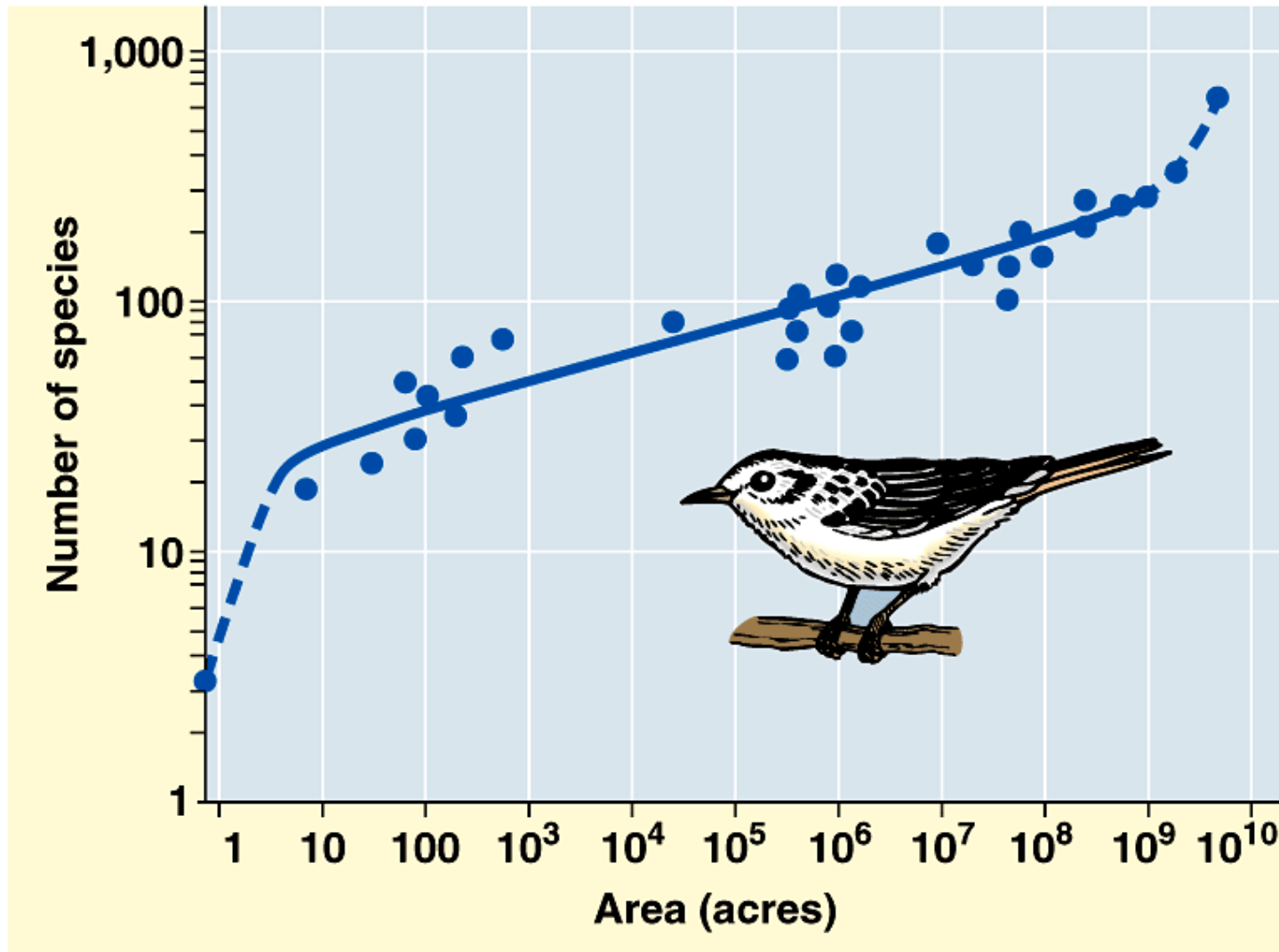
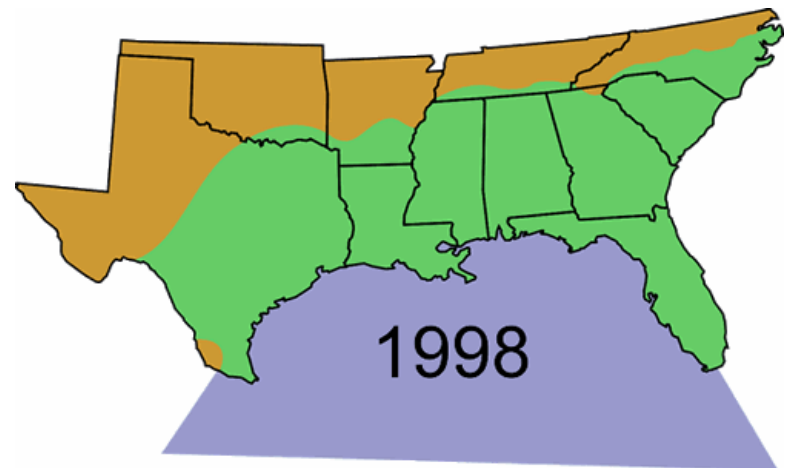
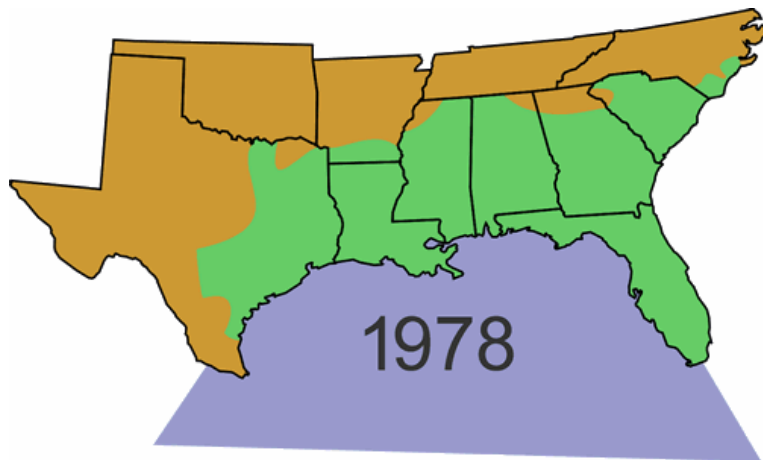
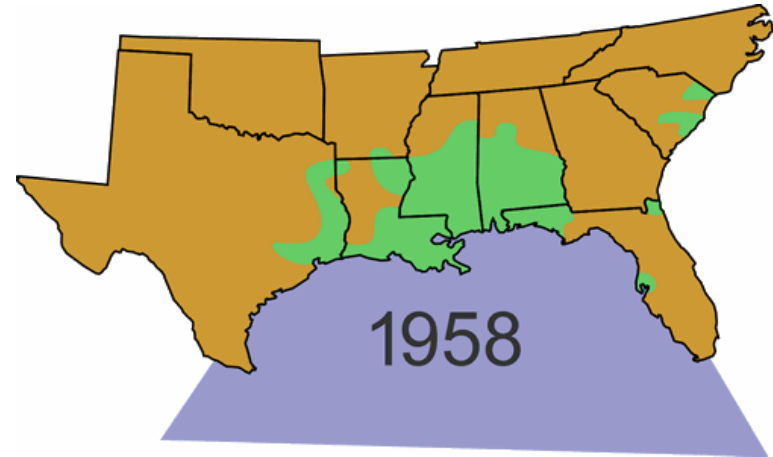
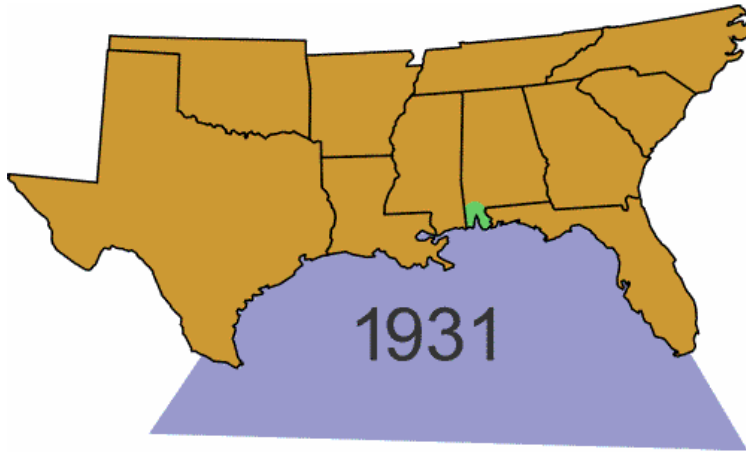


Fig 55.7 Introduced species

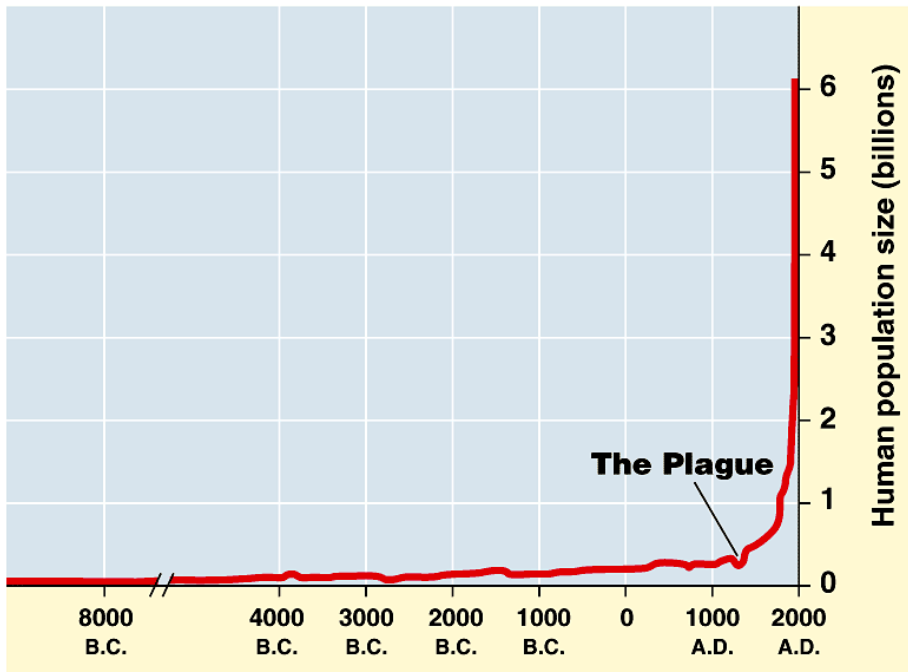




## Fire ant distribution

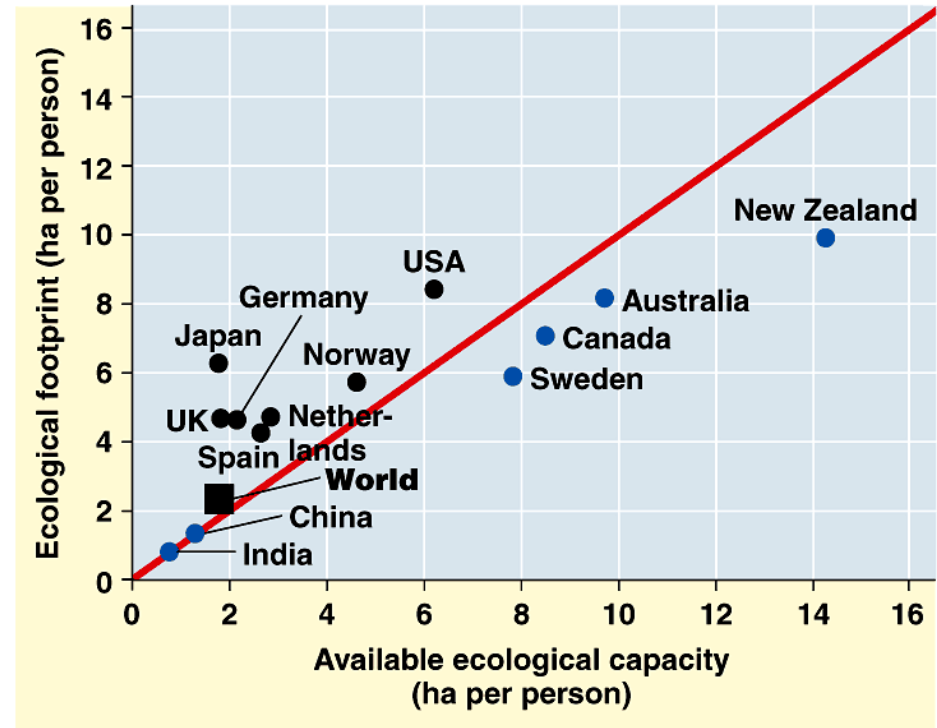


# Biodiversity crisis – the causes



Copyright © Pearson Education, Inc., publishing as Benjamin Cummings.

Human population  
increase



Copyright © Pearson Education, Inc., publishing as Benjamin Cummings.

Increased per  
capita resource use

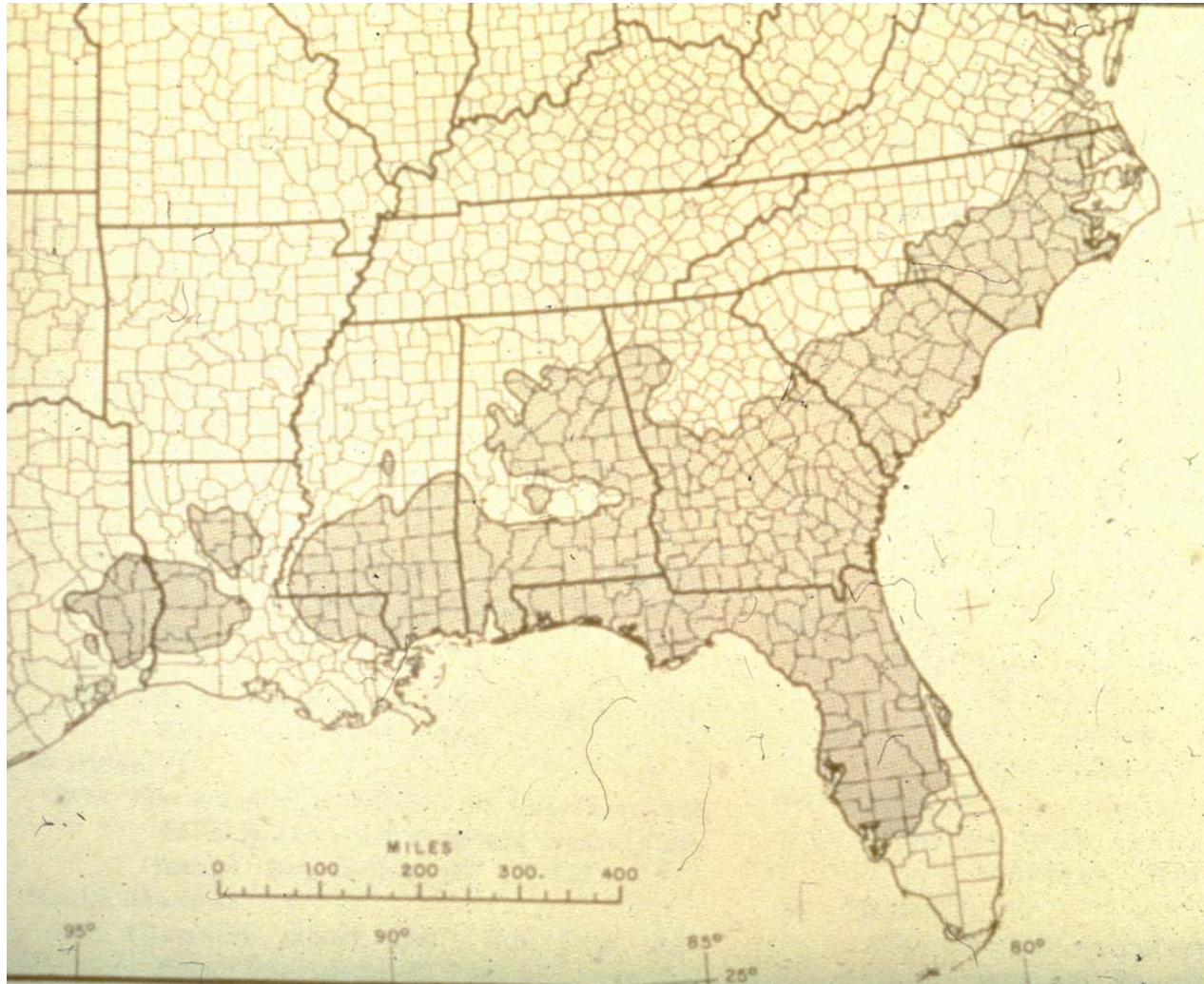


Fig 55.14 A case study: the red cockaded woodpecker





# Historical range of long-leaf pine forest and woodpecker





# Long-leaf pine ecosystem maintained by fire



Fran James



# Good Red Cockaded Woodpecker habitat



Fran James

# Chromatogaster ashmeadi

## favorite food of Red-Cockaded Woodpeckers



Research in Review





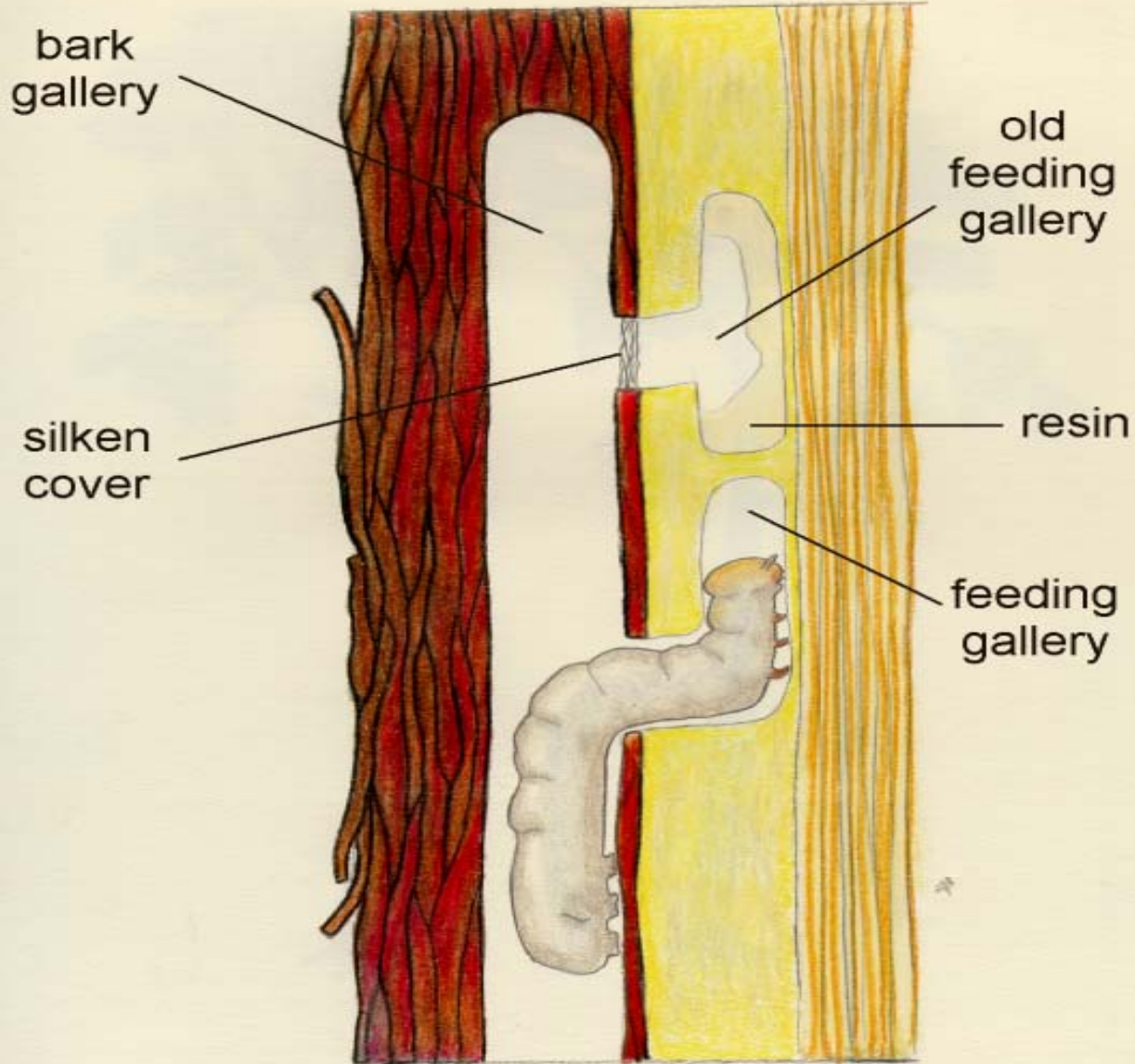
Ants live in  
galleries in bark of  
long-leaf pine



Made by the larvae of this uncommon moth  
- *Givira francesca*



# Bark Phloem Xylem



Larval feeding  
by *Givira*