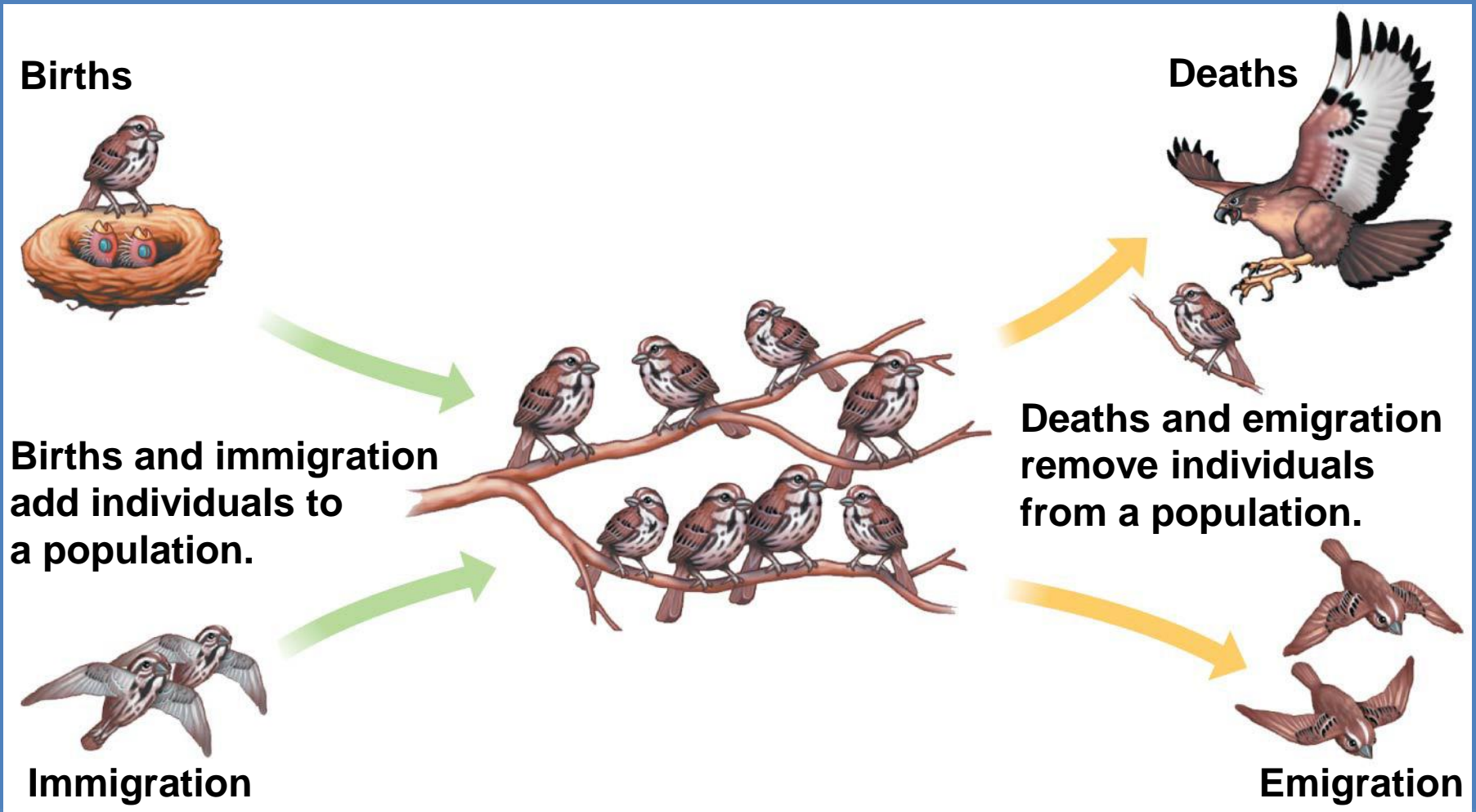# Managing Populations

Preview

1. Introduction
2. Resources
3. Threats
4. Interventions

Introduction

- Population descriptions involve:
  - Geographic boundaries
  - Number of individuals
- Influenced by 4 factors (BIDE)
  - Births
  - Immigrations
  - Deaths
  - Emigrations
- Generally focused on birth and death rates

1.

Births

Deaths

Births and immigration add individuals to a population.

Deaths and emigration remove individuals from a population.

Immigration

Emigration

Reece et al. 2015
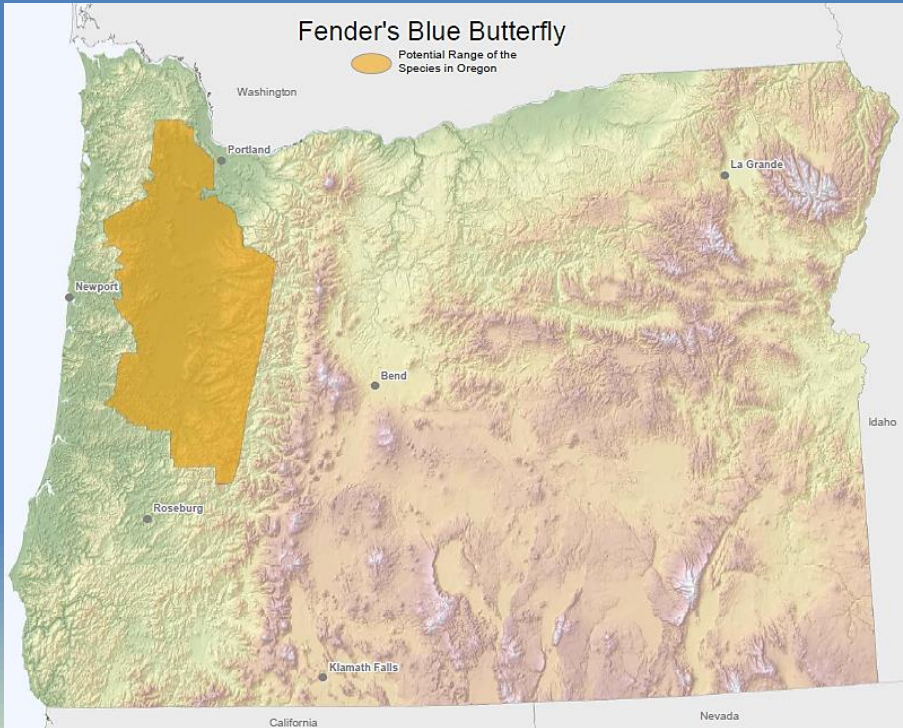
Introduction

- Survival and reproduction also differ across space and time
  - Different weather patterns
  - Quality of habitats
  - Presence of predators/prey
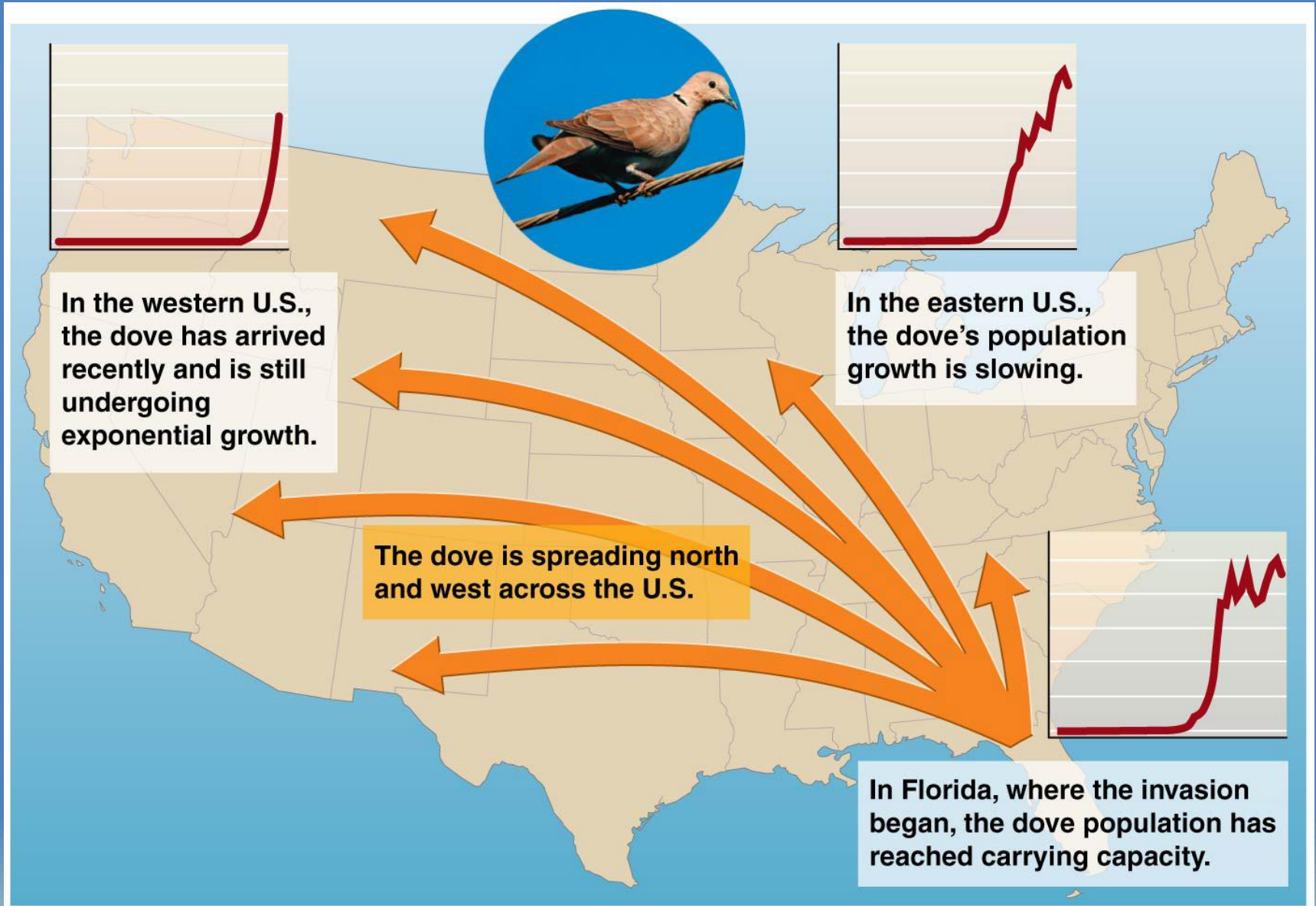 - Population trends

1.

[Dall's Sheep](#)

1.

Fender's Blue Butterfly

Images: www.wikipedia.org; www.fws.gov

1.

In the western U.S., the dove has arrived recently and is still undergoing exponential growth.

In the eastern U.S., the dove's population growth is slowing.

The dove is spreading north and west across the U.S.

In Florida, where the invasion began, the dove population has reached carrying capacity.

Eurasian Collared Dove

Withgott and Laposata 2014

Resources

- All organisms need:
  - –Nutrients for growth
  - –Some form of carbon
  - –Energy for doing cellular work
  - –Tolerable climate/habitat conditions

Resources

- Food
  - Supplemental feeding
  - Habitat improvement
- Often quite time-sensitive

Red Knot

USA

125 MM ➡ 52.5MM (42.1%)

ESTIMATED NUMBER OF HOUSEHOLDS IN 2014
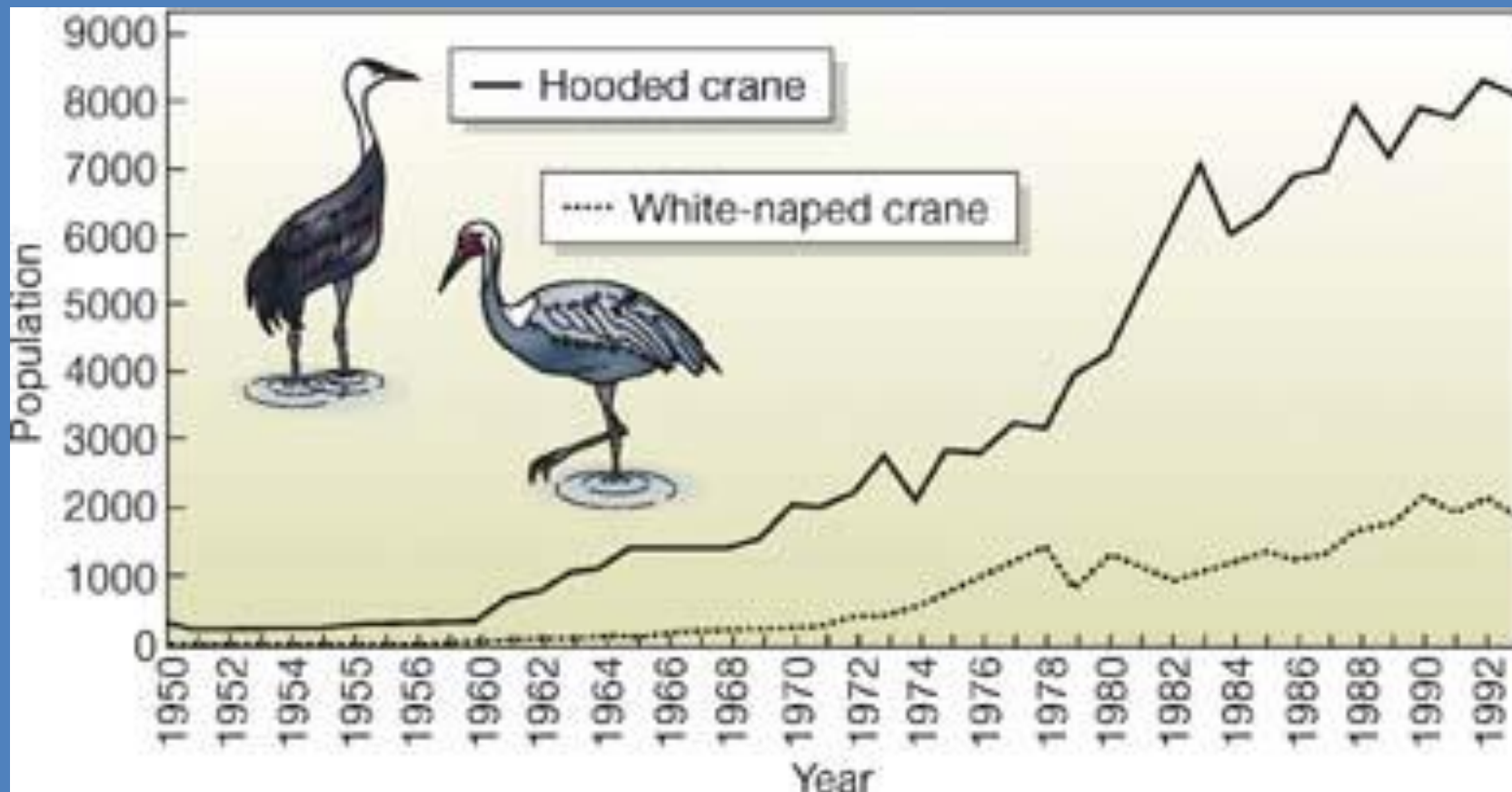
OF HOUSEHOLDS BUY WILD BIRD FEED AT LEAST SOMETIMES

$59.73 - AVERAGE ANNUAL SPEND ON WILD BIRDS **FEED**

$37.88 - AVERAGE ANNUAL SPEND ON WILD BIRDS **FEEDERS**

🏠 = 1,000,000 HOUSEHOLDS

[Plants for Birds](#)

2.

Positives: increased survival, especially in winter
Negatives: aggressive interactions; disease transmission; dependence on humans

Resources

- Water
  - Used in arid regions
  - Can be targeted at endangered or other species
    - e.g., livestock watering holes
    - Does have some disadvantages

2.

Plate 7.2 Satellite imagery showing overgrazing, Namibia. The dark
areas are where overgrazing is controlled, at upper left on
a well-managed commercial cattle ranch, and at lower right
in the protected Etosha National Game Park
(Remote Sensing Centre, FAO)
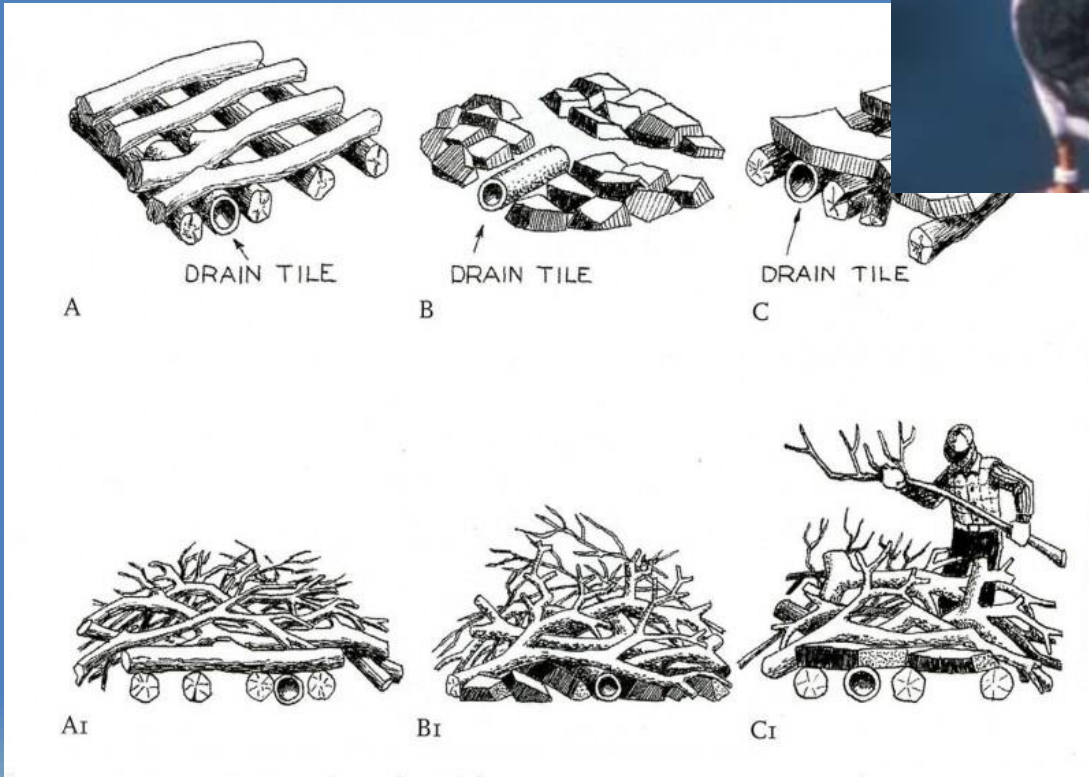
Effects of overgrazing on rangeland

Resources

- Habitats and Interactions
  - "If you build it, they will come"
  - Examples include:
    - Nurse plants/logs
    - Nest boxes
    - Feeding platforms
    - Brush piles

2.

DRAIN TILE — A

DRAIN TILE — B

DRAIN TILE — C

A1   B1   C1

Brush Piles

Nurse Logs

3.

Threats

- Species struggle to survive with:
  - Habitat alterations
  - Weather changes
  - Persecution by humans

Threats

- Game species
  - Outright bans
  - Seizure/confiscation
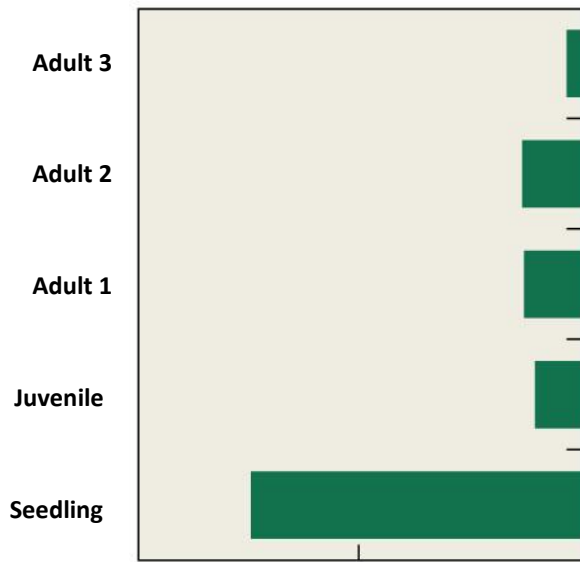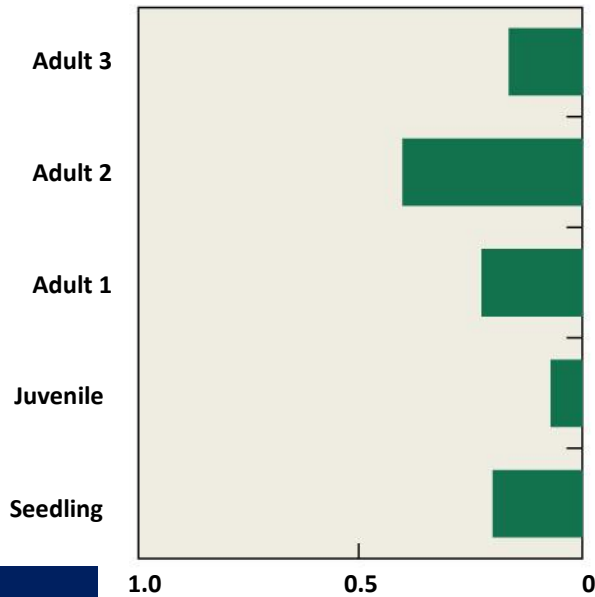 - Restricted seasons for hunting/collecting

Ivory Ban

3.

Rhino Tech

3.

Open

Understory

Category	Plant size (area in cm²)	Stage
Seedling	0.5–5	Cotyledons present
Juvenile	5.1–35	Nonreproductive
Adult 1	35.1–200	Potentially reproductive
Adult 2	200.1–600	Potentially reproductive
Adult 3	Larger than 600	Potentially reproductive

(a)

(b)

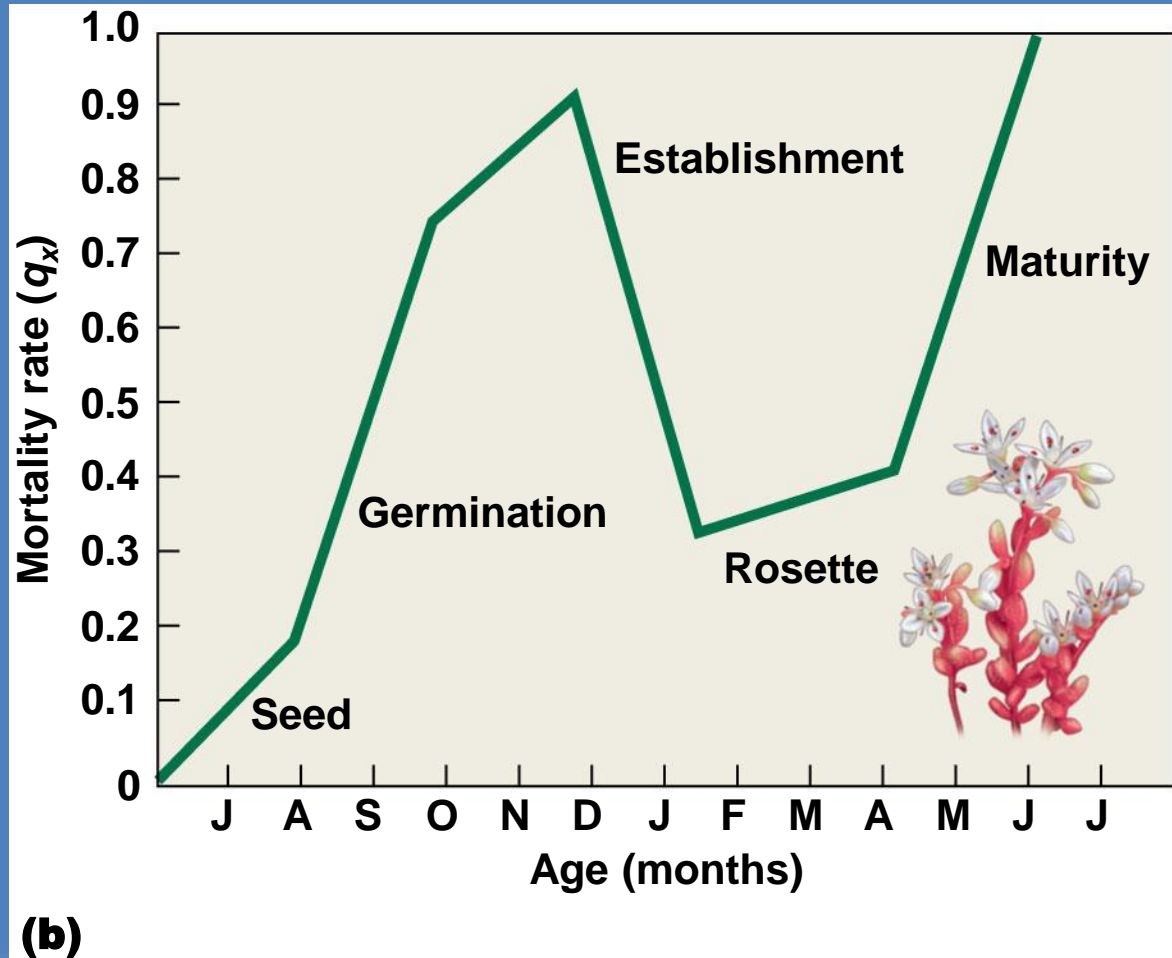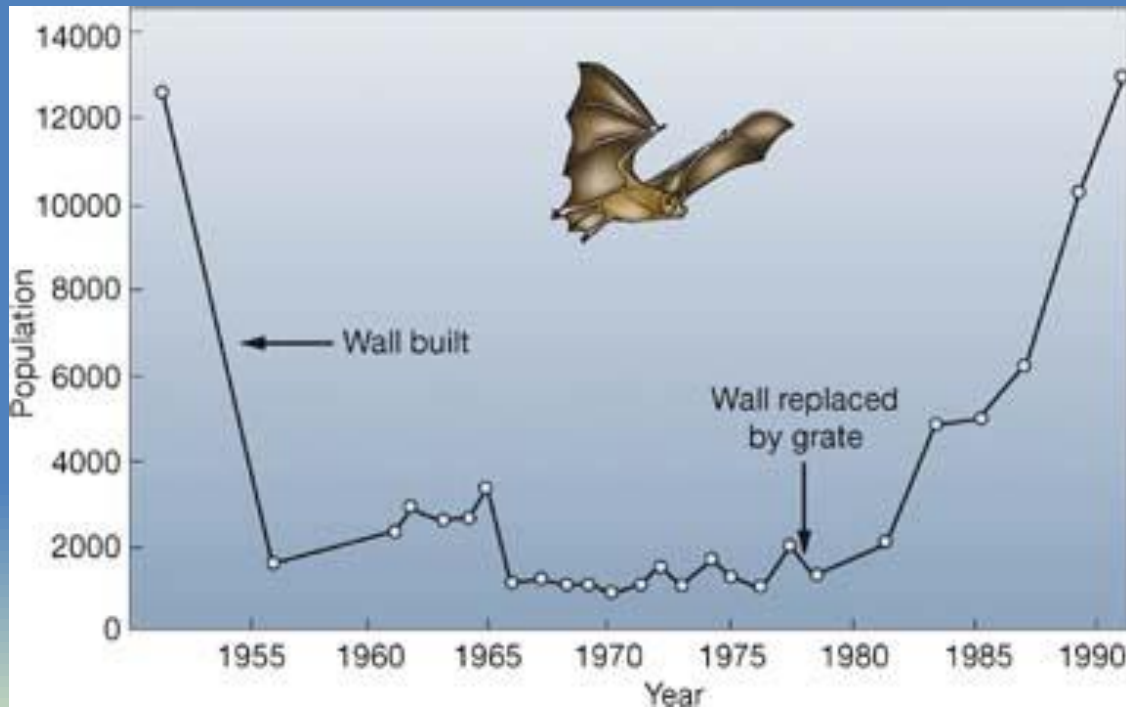Proportion of population

1.0   0.5   0

2.

(b)

Figure 9.7

Threats

- Habitat alterations
  - Destruction of corridors
  - Temperature changes
  - Predator introduction/exclusion
  - Increased parasite/disease load

3.

Cowbirds

4.

Interventions

- Translocations
  - Three types
    - Introduction
    - Reintroduction
    - Augmentation
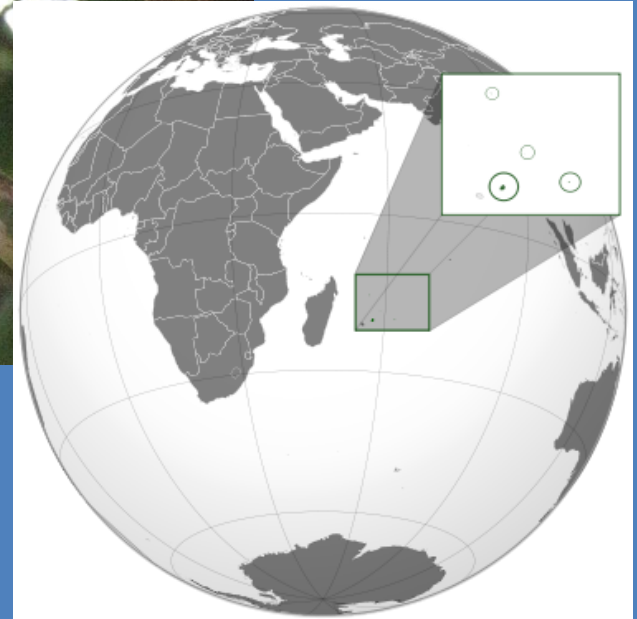
CA Bighorn Sheep

Interventions

- Artificial breeding programs
  - Increase reproductive output through
    - Double-clutching
    - Head-starting
    - Hatcheries

Interventions

- Mauritius Kestrel
  - Rarest bird in the world: 4 individuals
  - Captive rearing attempts failed
  - Double-brooding
  - Hacking of juveniles
  - Current population: ~400

4.

Kestrel Restoration

Resources

<u>Publications</u>

Hunter Jr., M. L., and J. Gibbs. 2007. Fundamentals of Conservation Biology, 3rd Edition. Blackwell, Malden.

Smith, T.M., and R.L. Smith. 2015. Elements of Ecology, 9th Edition. Pearson, New York.