



# Lecture 1

## Introduction to population ecology

WILD3810 (Spring 2019)

# Readings



Mills 3-12

Powell 6-10

# What is population ecology?

Population ecology is the study of the distribution of individuals in a population over time and space

# Population ecology

# Population ecology forms the basis for modern natural resource management

- Conservation



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- Conservation
- Management



# Population ecology forms the basis for modern natural resource management

- Conservation
- Management
- Population control





# Definitions

# Population

| A group of organisms of the same species occupying a particular space at a particular time

# Interactions

A common concept in all definitions of a population is some potential for interactions among individuals

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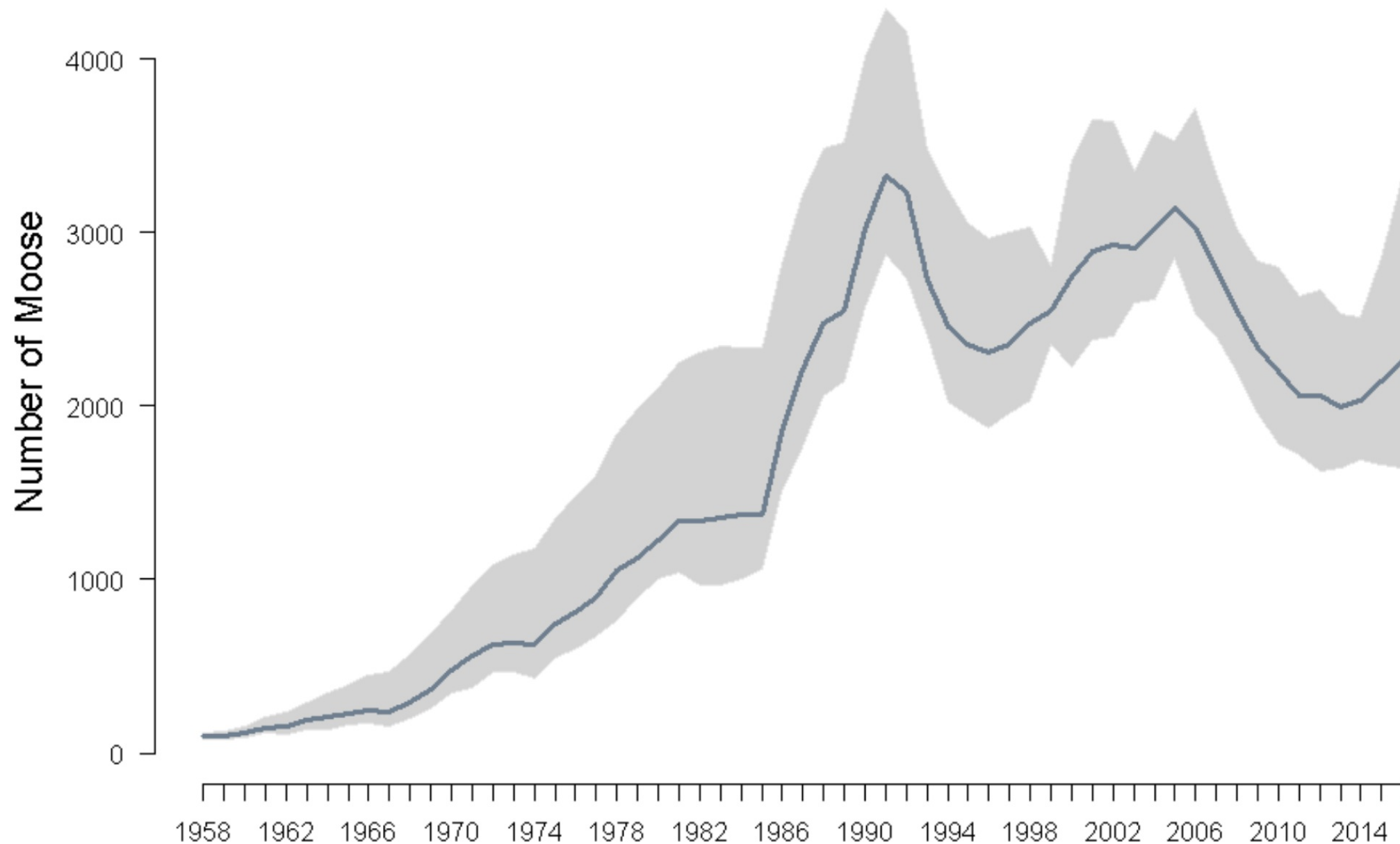
- interactions can be direct (fighting for territories, reproducing) or indirect (food depletion)
- some definitions refer to reproduction - what about non-reproductive periods of the life cycle?

# Abundance (population size)

| the number of individual organisms in a population at a particular time

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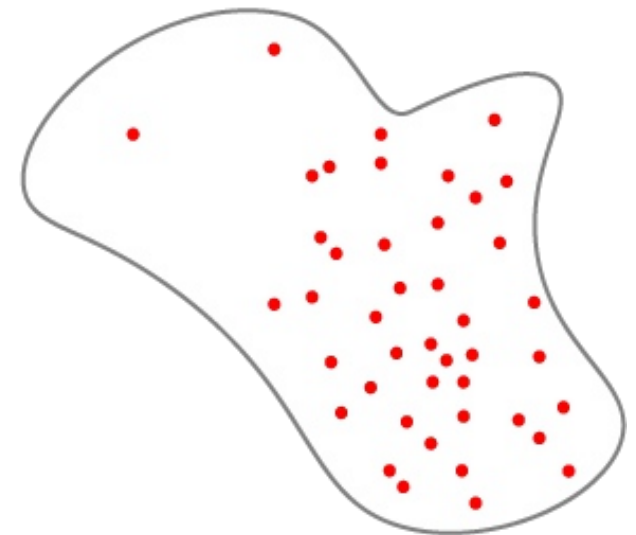
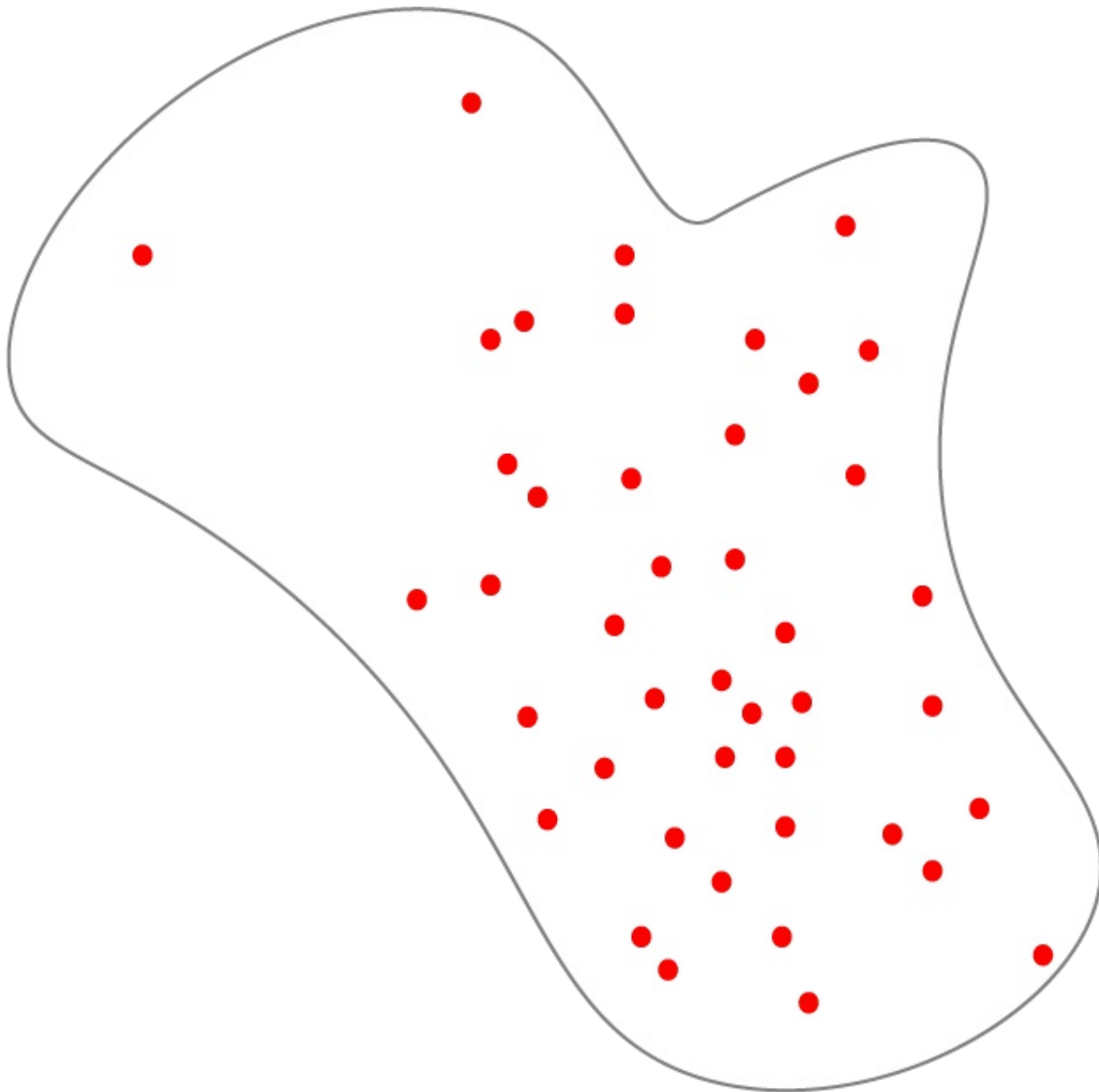
# Density

| the number of individuals relative to a critical resources (i.e., space)



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Why are you interested in population ecology?

# Questions that population ecologists ask:

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- Why is this species found here and not there?
- Are there more of this species than there used to be? Why?
- How many individuals of this species can be harvested each year?
- Will climate change cause this species to increase or decrease?



# Models of populations

Answering these questions **requires** models

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Models link **observations** to **processes**

Models are tools that allow us to learn about the real world

- By necessity, models are simplifications of reality

By the end of the course, you will be a  
modeler!

# The modeling process

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1) Define the problem

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- How many individuals will be in our population next year?



# The modeling process

- 1) Define the problem
- 2) Identify the important variables

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2) Identify the important variables

- population size this year

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- population size this year
- number of births

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- population size this year
- number of births
- number of deaths
- number of immigrants
- number of emigrants

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- 1) Define the problem
- 2) Identify the important variables
- 3) Create the model

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- 2) Identify the important variables
- 3) Create the model
- 4) Solve the model
  - Count the individuals!
  - Estimate birth/death rate
  - Measure movement

# The modeling process

- 1) Define the problem
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- 3) Create the model
- 4) Solve the model
- 5) Interpret the results

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- 1) Define the problem
- 2) Identify the important variables
- 3) Create the model
- 4) Solve the model
- 5) Interpret the results
  - Do the results make sense?

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is the **State Variable** of a population