Lecture 1

Introduction to population ecology

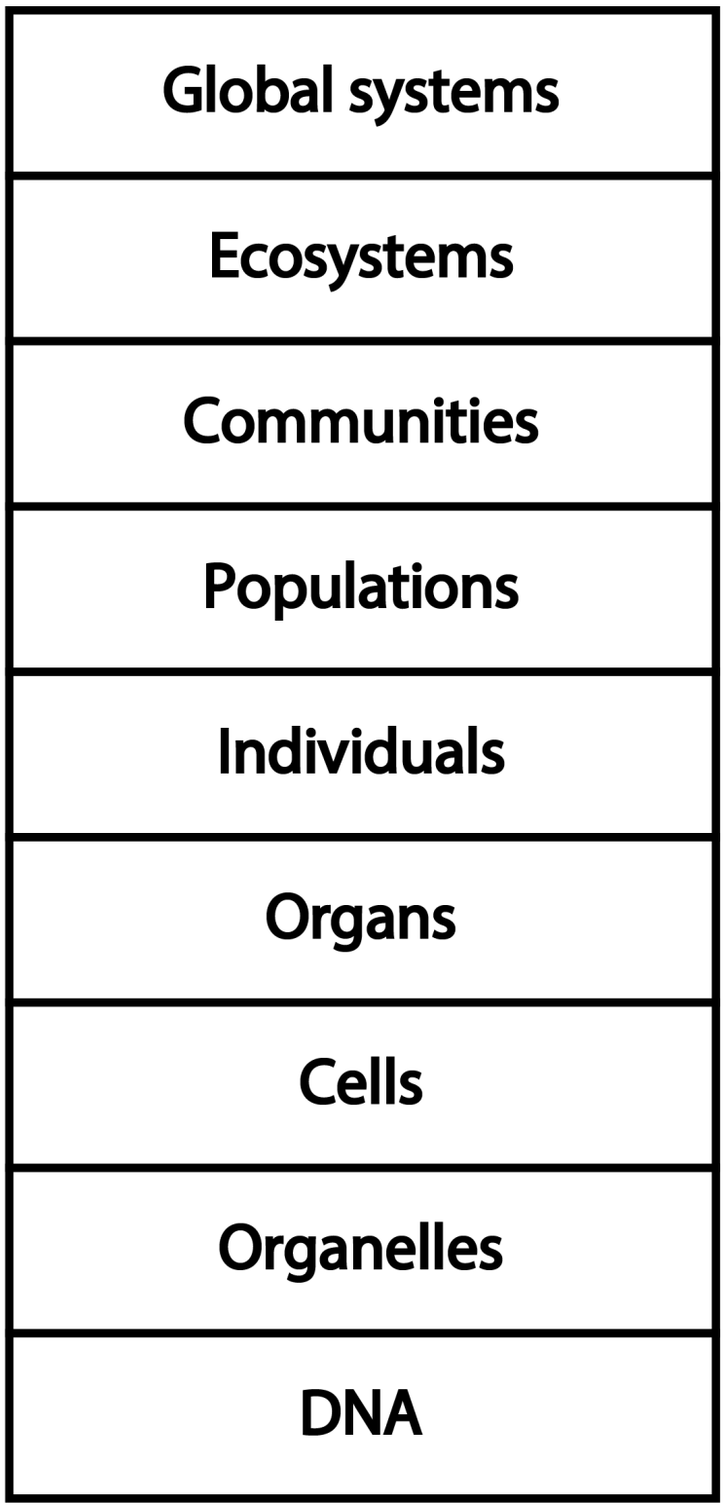
WILD3810 (Spring 2019)

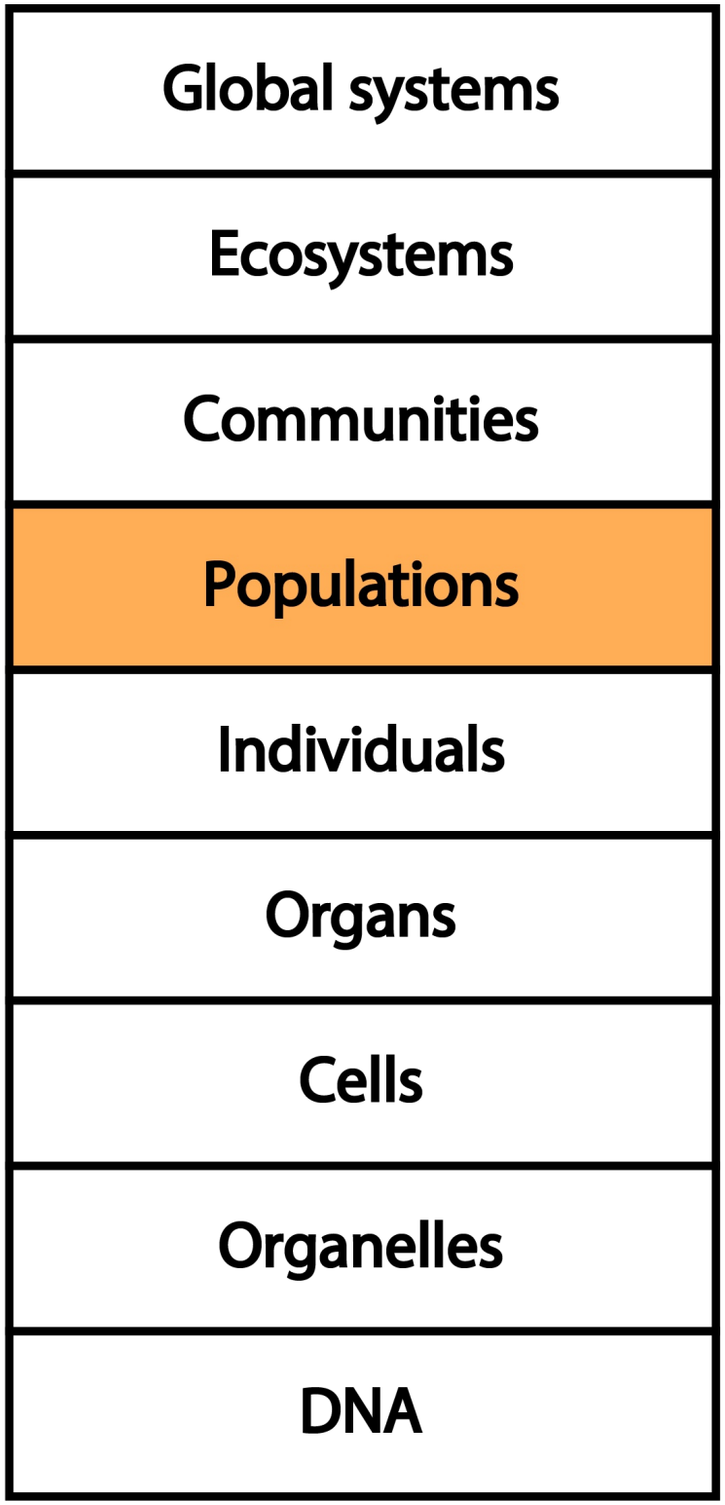
Readings

> 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


Global systems
Ecosystems
Communities
Populations
Individuals
Organs
Cells
Organelles
DNA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Population ecology forms the basis for modern natural resource management

- Conservation

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- Management

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- 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)

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

- 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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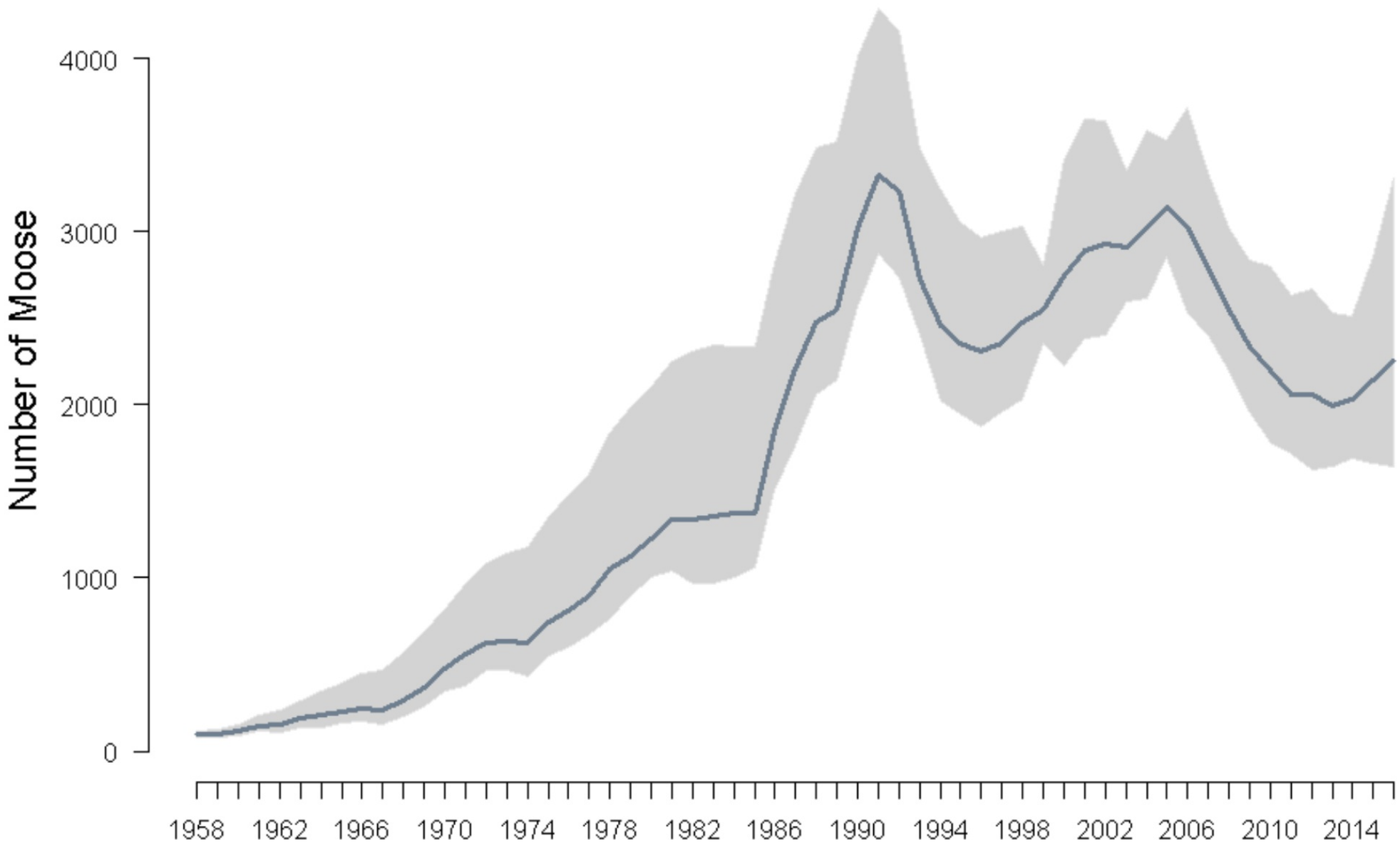

Density

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

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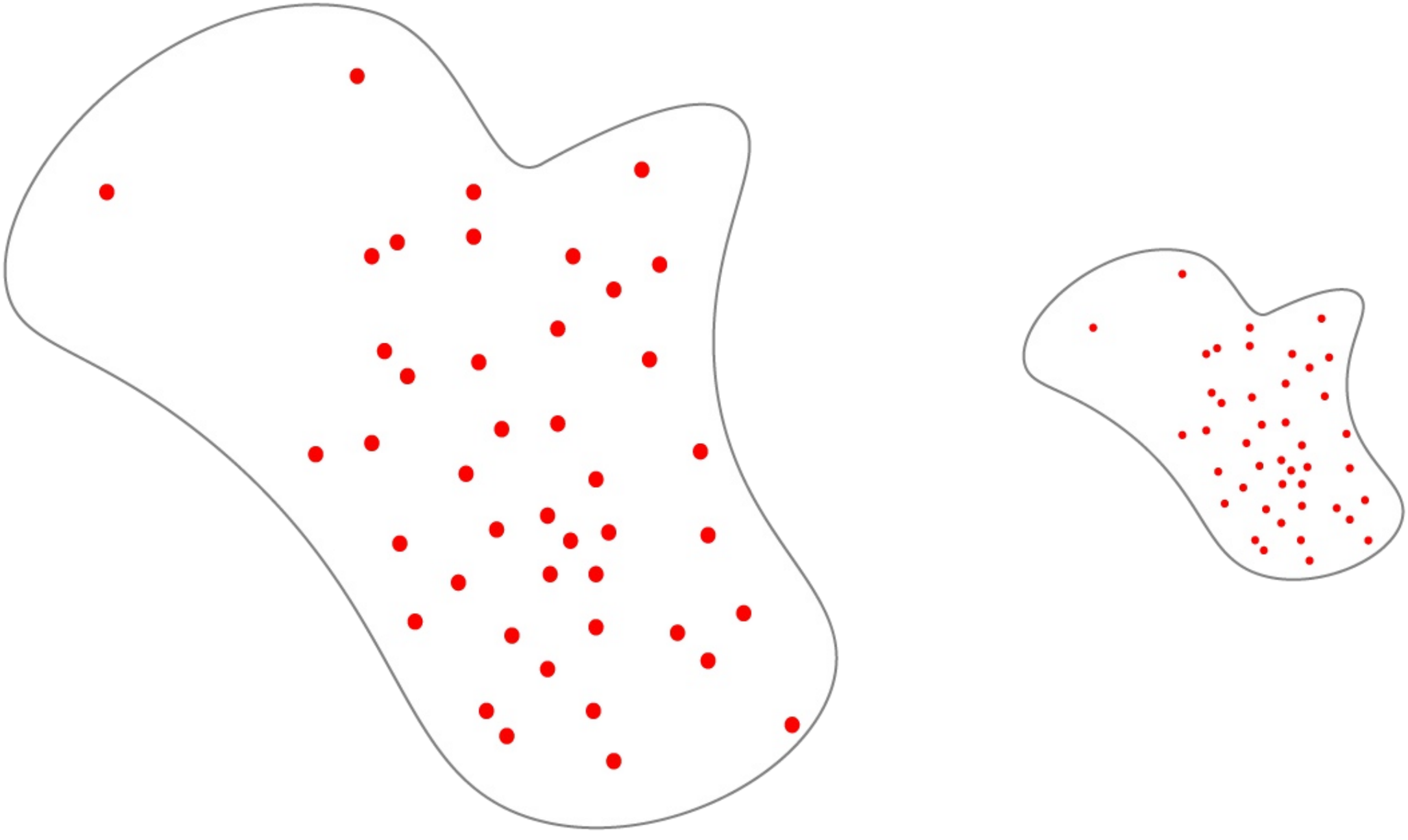

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Why are you interested in population ecology?

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 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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- 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

The modeling process

1) Define the problem

2) Identify the important variables

3) Create the model

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1) Define the problem

2) Identify the important variables

3) Create the model

4) Solve the model

The modeling process

1) Define the problem

2) Identify the important variables

3) Create the model

4) Solve the model

- Count the individuals!

The modeling process

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2) Identify the important variables

3) Create the model

4) Solve the model

- Count the individuals!
- Estimate birth/death rate

The modeling process

1) Define the problem

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

2) Identify the important variables

3) Create the model

4) Solve the model

5) Interpret the results

The modeling process

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