

Introduction to Populations

Concept of populations

- Although the means of managing wildlife are often carried out through manipulation of habitats, objectives are usually defined in relation to wildlife populations.

Population is the fundamental unit of wildlife and fisheries management

- -although we harvest or transplant individuals, we do this to accomplish specific population objectives
- 1. prevent extinction
- 2. reduce numbers of harmful species
- 3. manage the harvest

- we manage populations (this fundamental difference of attitude sets most wildlife managers somewhat apart from animal rights folks).
- -this also creates a controversy within wildlife management as some research is conducted on individual organisms and this information is used to make inferences about populations whereas, some research is conducted at the level of the population and is used to make inferences about individuals.

Defining and delineating populations

- Population defined: Population is a group of interbreeding organisms of the same species, occupying a specified place at a specified time (having little or no contact with other such groups) (pretty much from Mills 2007).—or just a collection of individuals (Vandermeer and Goldberg 2003).

How do we delimit the entity that we manage?

- depends on management objectives--a population is an assemblage of organisms that the biologist has chosen to study (or make inferences to).

In population biology there are two fields

- 1. population genetics-below the level of the individual-dealing with mutation, natural selection, gene frequencies
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- 2. population ecology-at or above the level of the individual

We seek a natural spatial unit that makes sense for management

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- With increases in knowledge of population ecology, it becomes easier to delineate populations (i.e., using metapopulation theory or gene flow among individuals).
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- However, in some instances, we've done pretty good at delineating populations in the past based on movements of individuals or using geographic boundaries and assuming no or limited movements.

Examples

- Examples in South Dakota are: waterfowl flyways, big game herd units, habitat demarcations, east-versus-west river.
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- In some management regimes, we must also define temporal boundaries of populations due to annual fluctuations.
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- An example might be 'pre-season' and 'post-season' populations

Characteristics of populations

Something that can be measured at one point in time

- size, age and sex ratios, genetic composition (variability, resilience, structure), physiological state
- Population Momentum?

Processes in populations

Mechanisms by which population characteristics change (rates)

- births and immigration (add to populations)
- deaths and emigration (subtract from populations)
- Analogy of a lake with water into the lake being births and water out of the lake being deaths.

- Population dynamics is the study of the reasons for changes that occur in natural populations.
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- Population Management is the intentional modification of population processes to obtain specific objectives with respect to population characteristics.
- In managing populations we need reliable information both on population attributes and processes.

Discussion items:

- Individuals vs. populations?
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- How important are genetics in managing populations?
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- Can we really delineate all populations adequately for management purposes?