

# Quantifying the Impact of Population Size on Natural Selection Across the Genome

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# Why



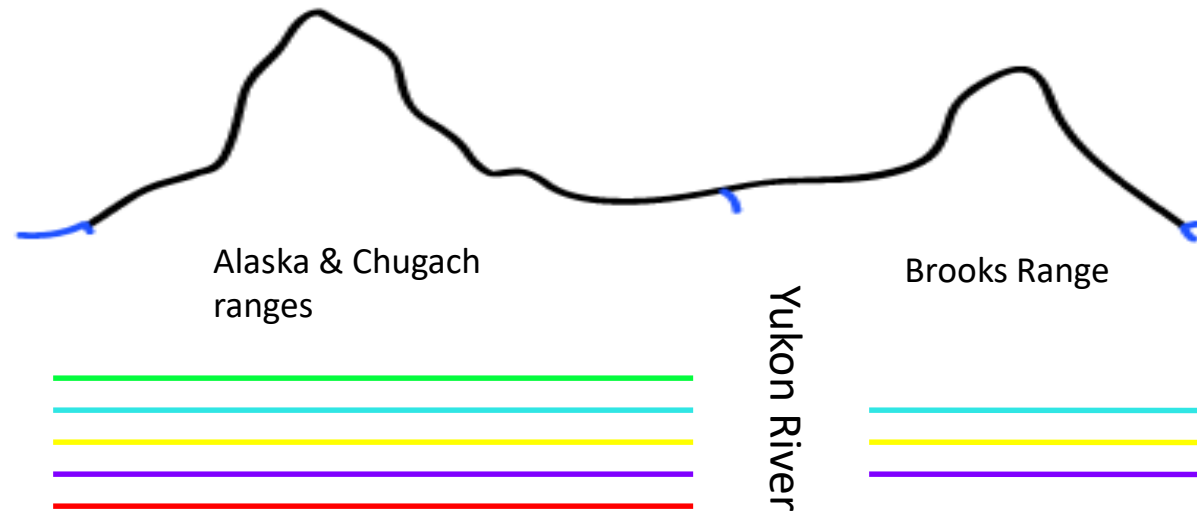
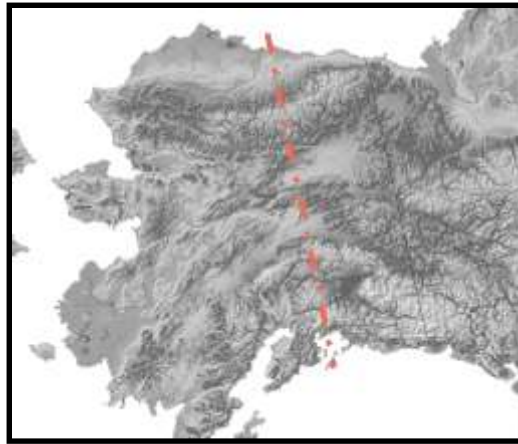
Anthropogenic;

adjective

1. created by people or caused by human activity:  
*anthropogenic pollution*



# Mammals of the Alaskan alpine



All five species are south of the Yukon river

Only three occur north



collared pika



hoary marmot



singing vole



Arctic ground squirrel



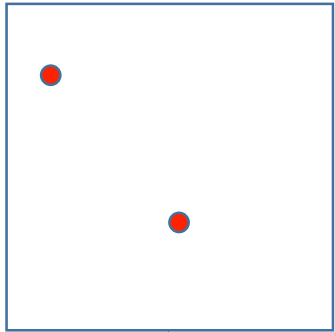
brown lemming



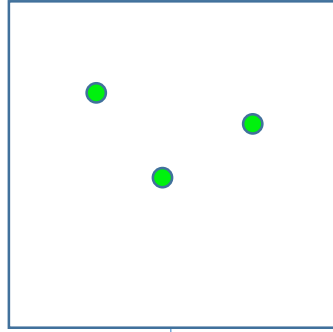
most

habitat specificity

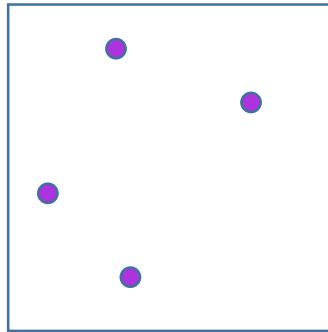
least



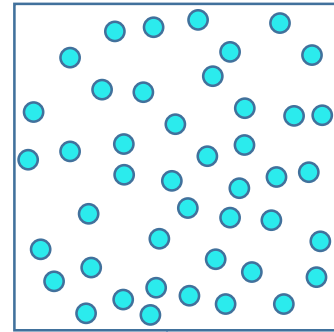
collared pika  
0.62-7.2



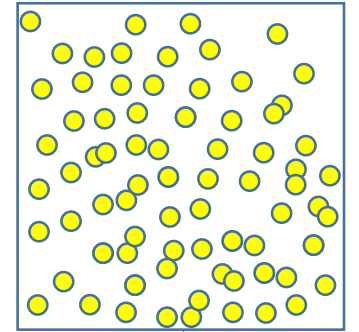
hoary marmot  
0.6-7.8



singing vole  
1.5-6



ground squirrel  
5-50



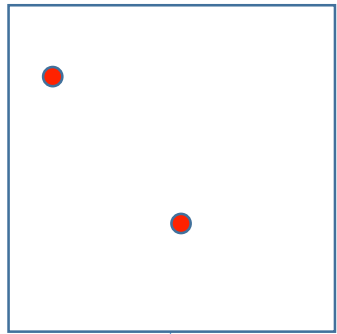
brown lemming  
50-200

animals/ha

# Impact of genetic drift

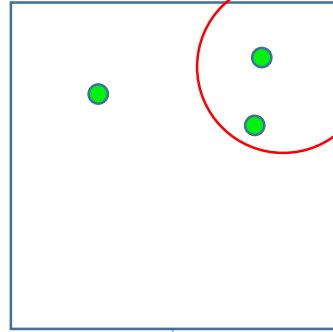
Death by chance

Death by chance



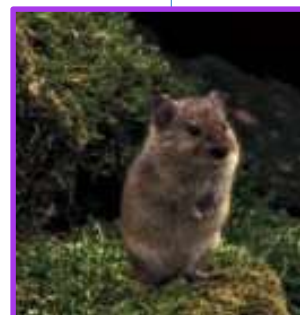
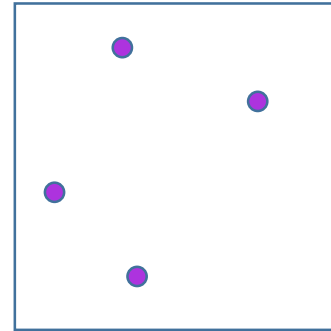
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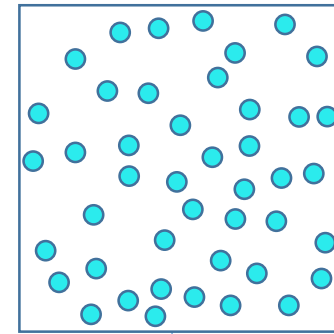
hoary marmot

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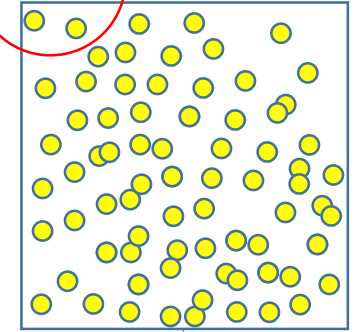
singing vole

1.5-6



ground squirrel

5-50



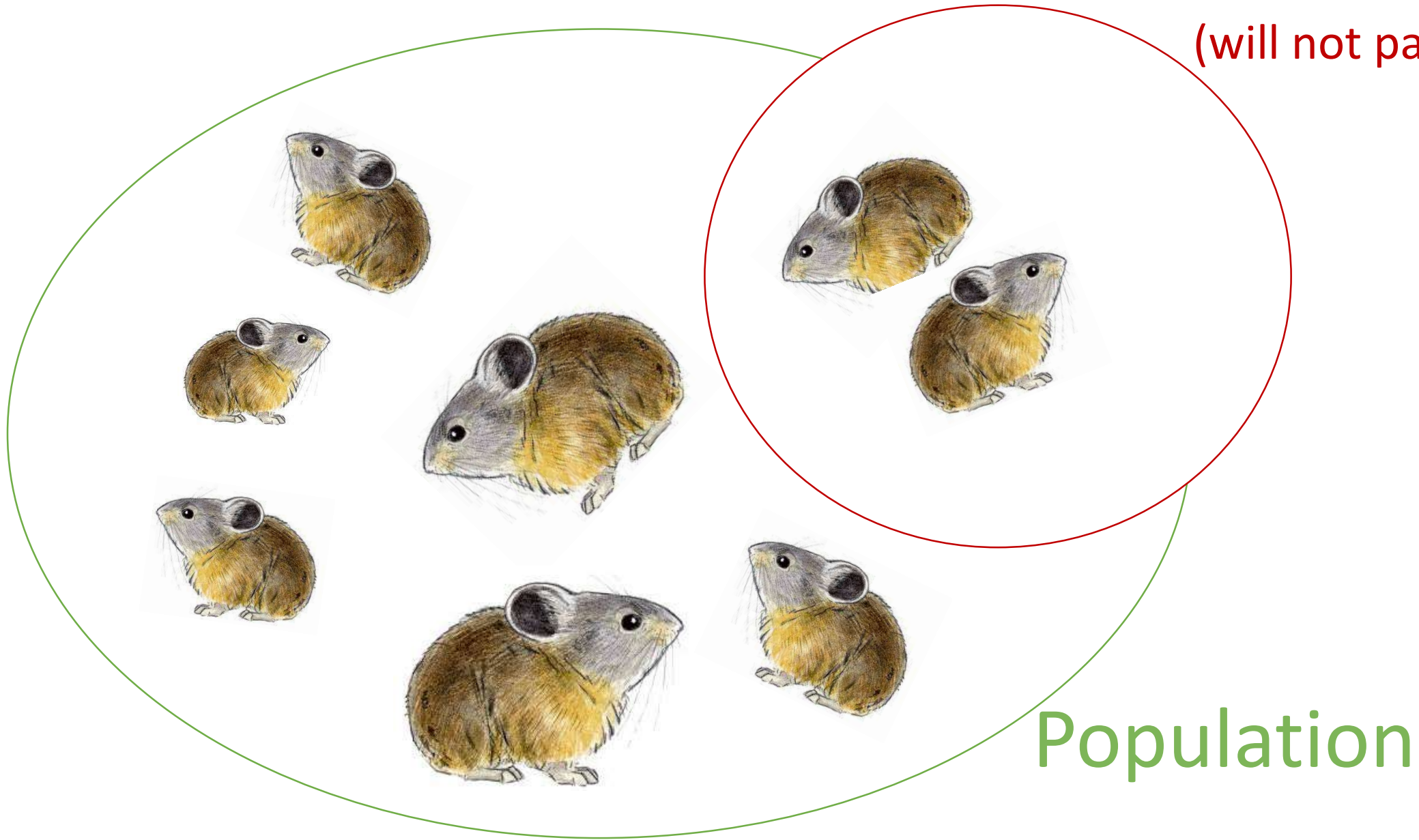
brown lemming

50-200

# Genetic Drift

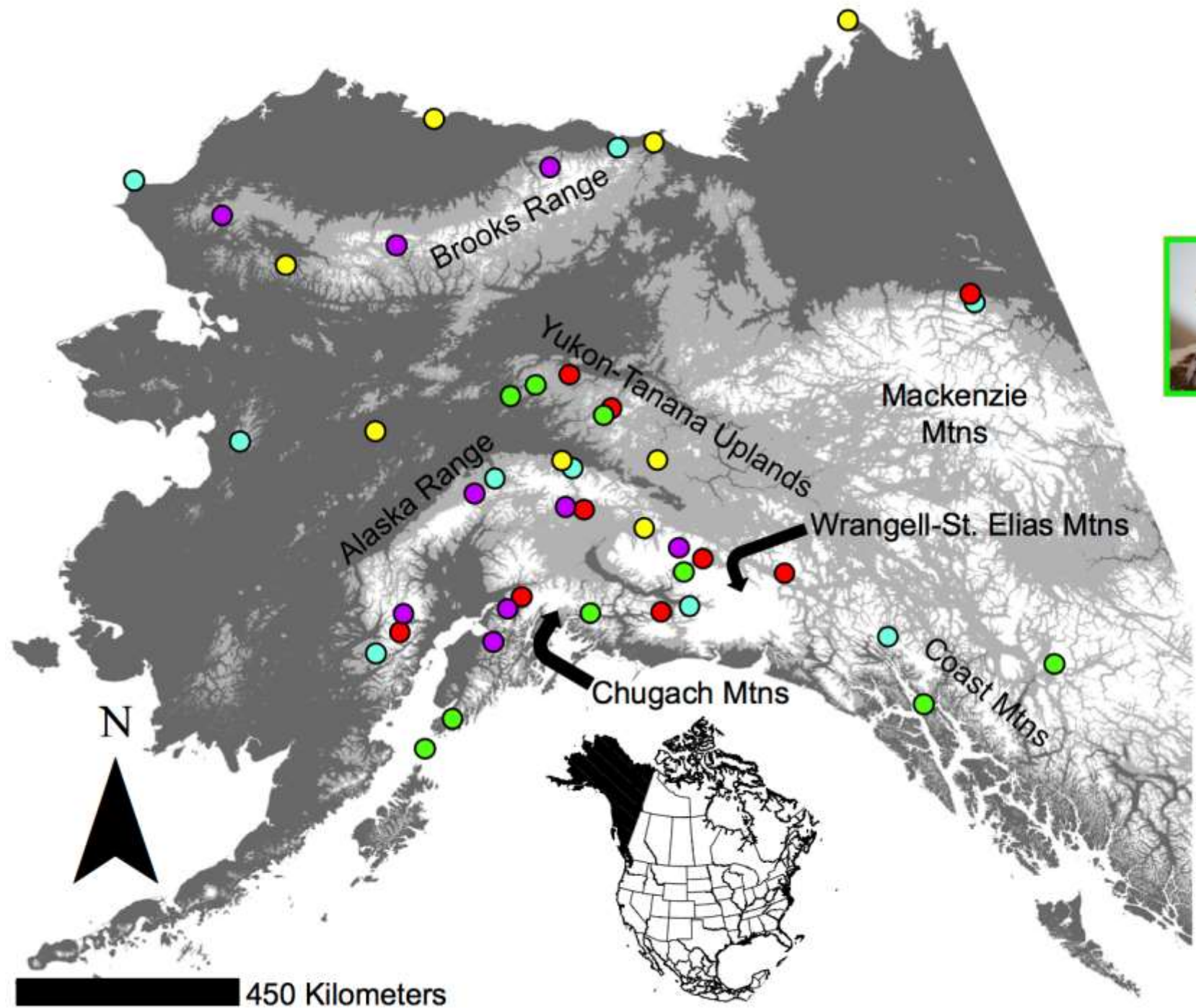
# Death by Chance

(will not pass on genes)

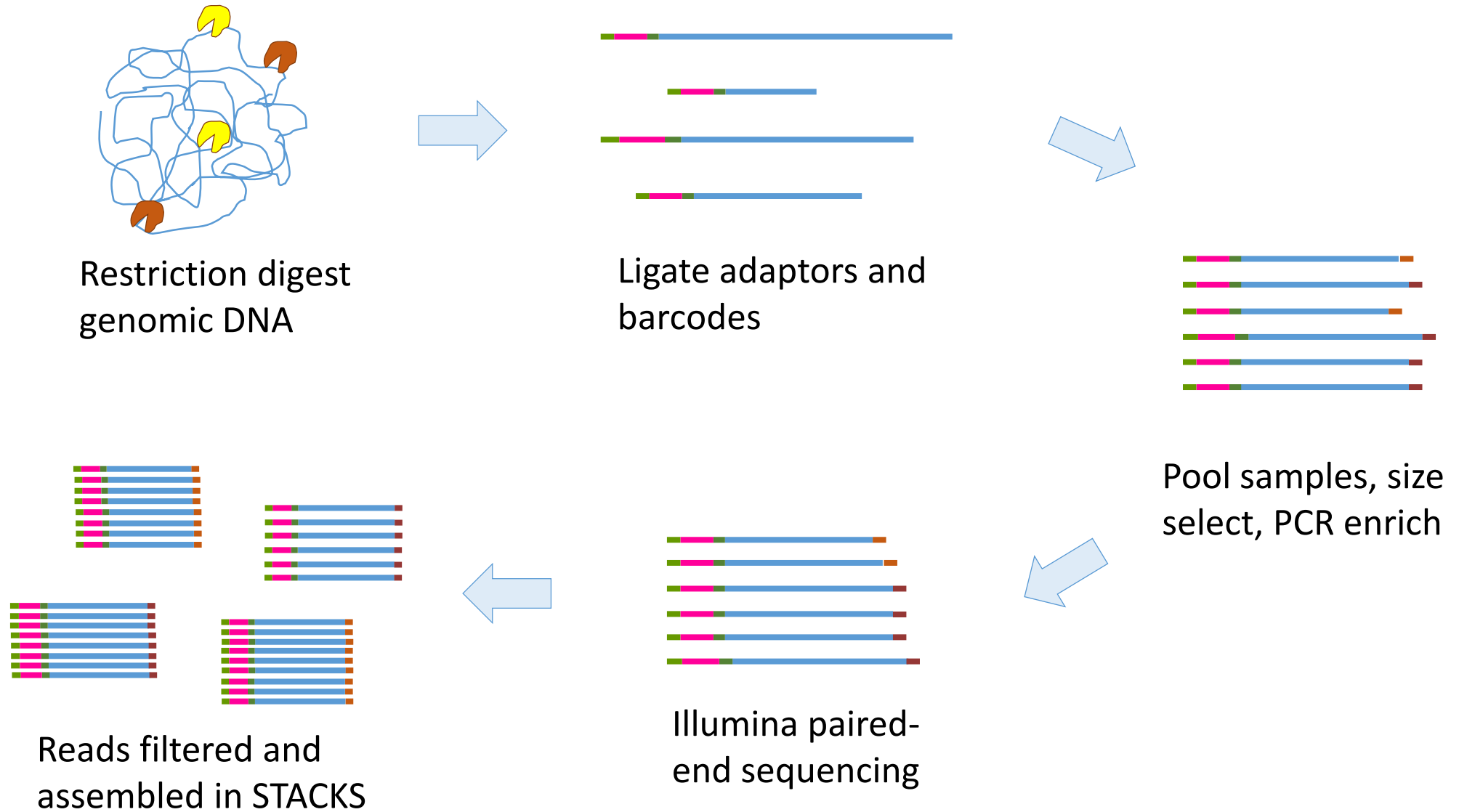


What is the impact of genetic drift on different size populations of Alaskan mammals?

Samples for sequencing collected from co-distributed populations throughout Alaska



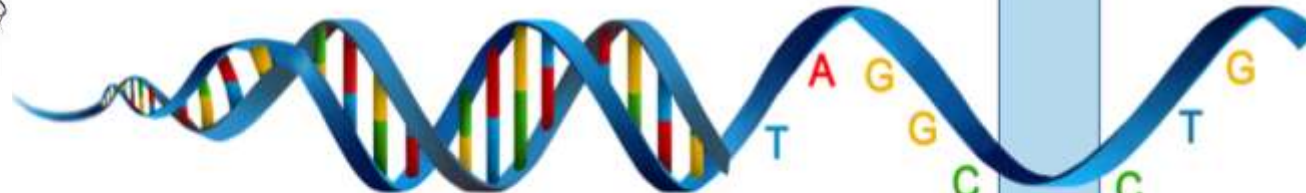
# Genomic data collection



# Single Nucleotide Polymorphism (SNP)



STACKS

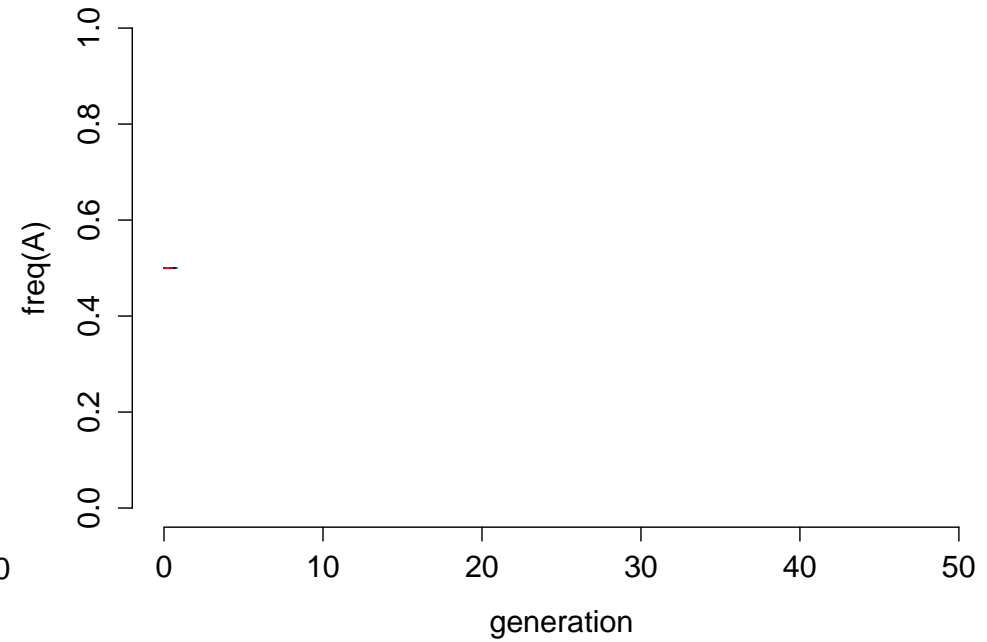
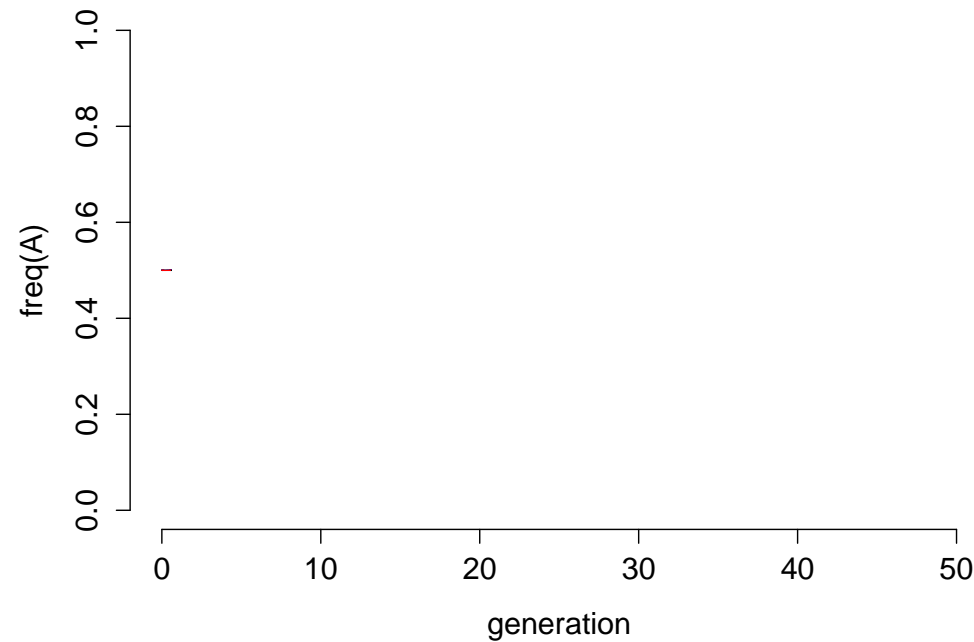


SNP

# What the simulations tell us

Species with larger population sizes have greater nucleotide diversity

selection coefficient ( $s$ ) = 0.2



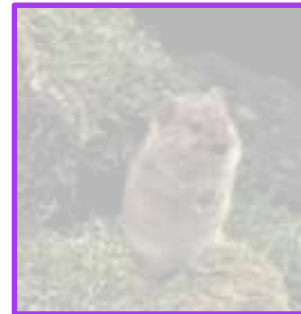
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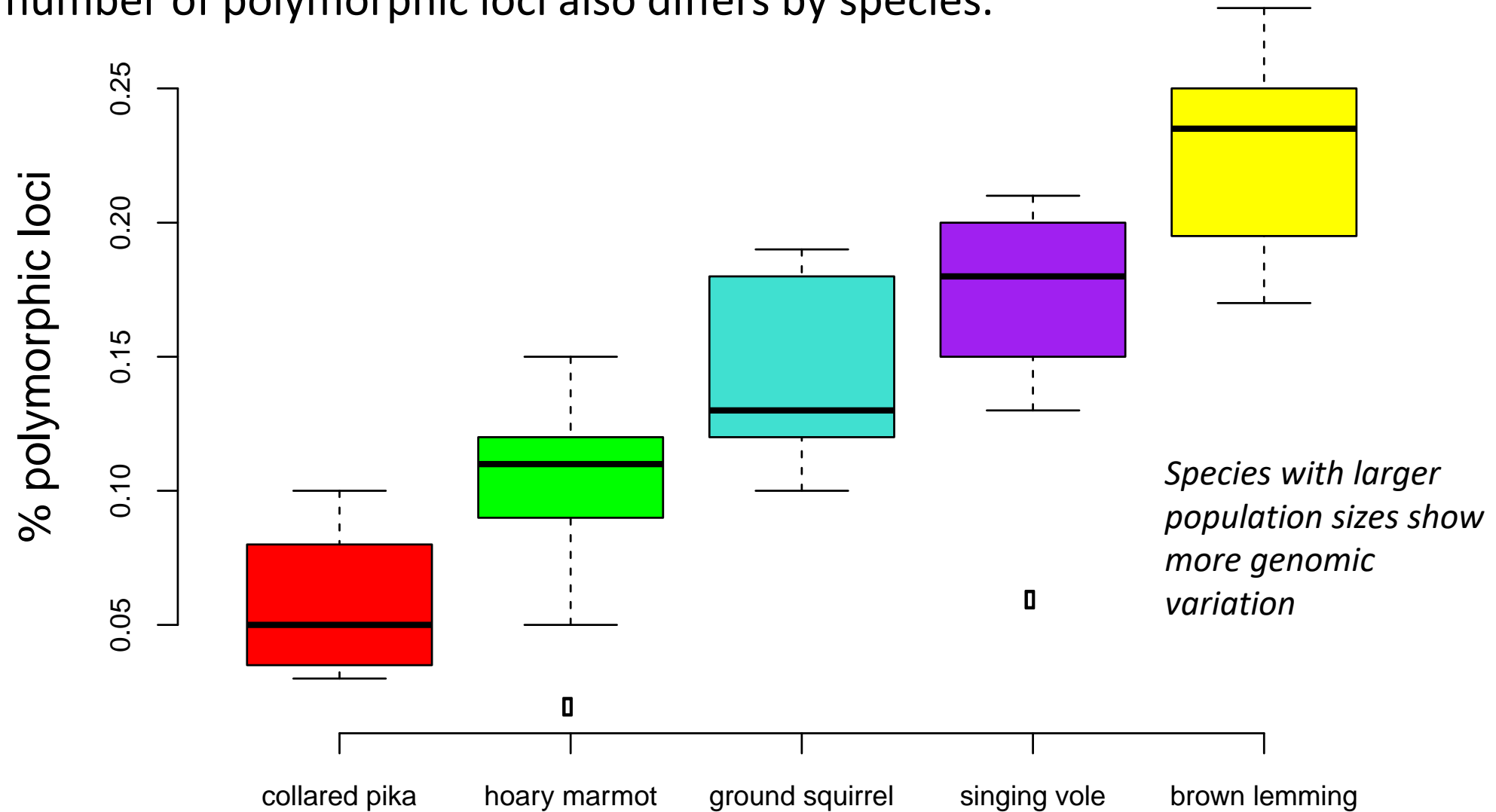
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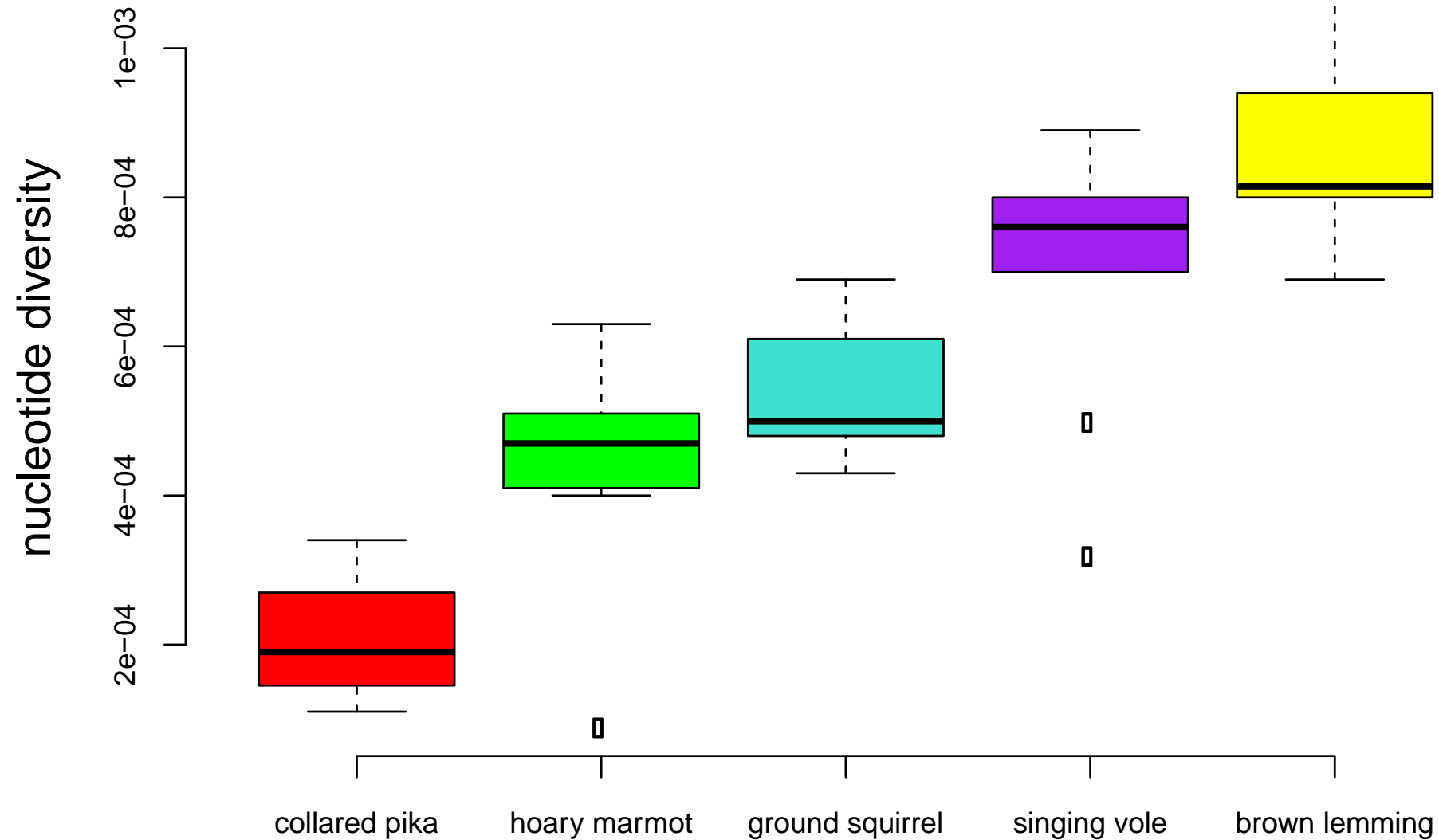
# What the genomic data tell us

The number of polymorphic loci also differs by species.



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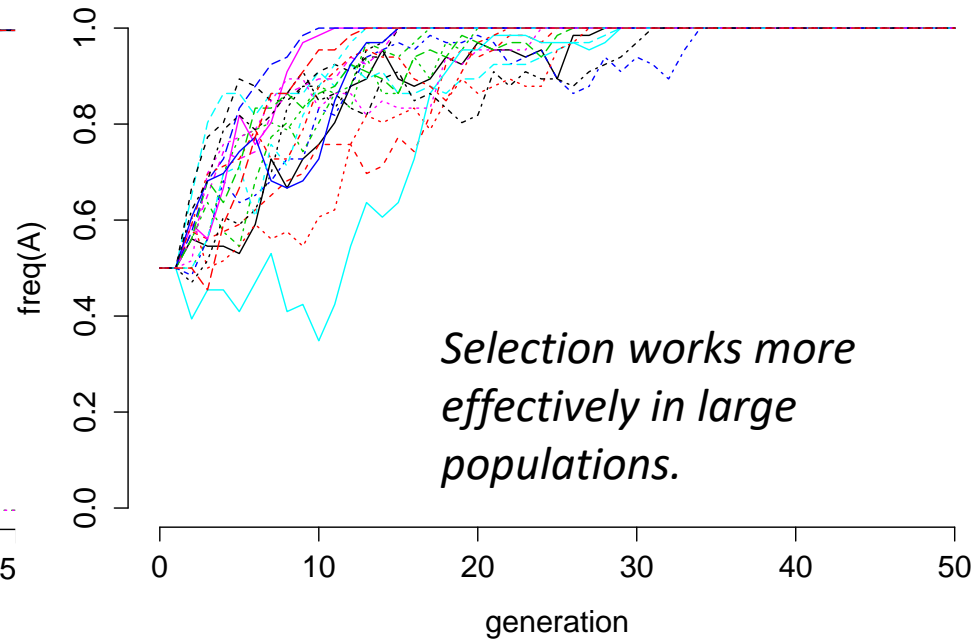
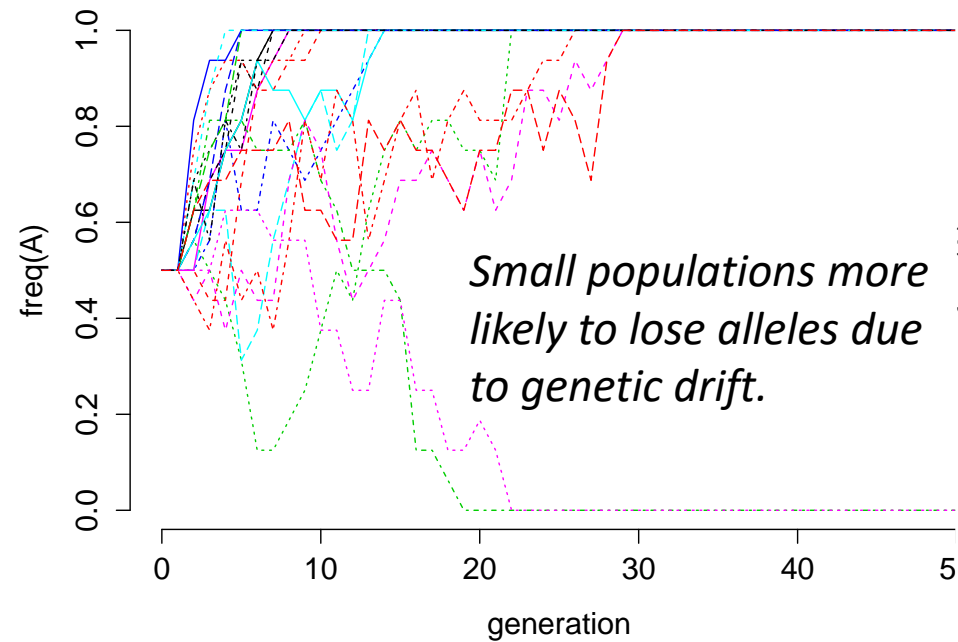


# Rapid shift in climate

# Can adaptation keep up?



# Conservation & Monitoring incorporating this information



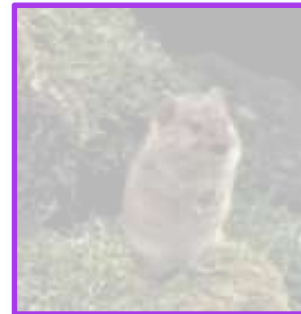
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# Acknowledgments

- Wyoming INBRE
- Dr. Hayley Lanier
- Dr. Vikram Chhatre
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