

**Research Hypotheses and Asking Why:
An Example Using Northern Goshawks**



Goal of science

To offer explanations and predictions about the natural world.

1. scientific method is the most efficient technique for acquiring *reliable knowledge*
2. it enables use to determine the underlying mechanisms to observed patterns
 - able to go beyond mere description and ask *why* these patterns occur



Hypothesis

a *candidate explanation* for a pattern observed in nature

a potential reason for the pattern >>> it should be testable and falsifiable

A research hypothesis is:

MORE THAN a mere statement of fact: e.g., goshawks nest in mature forest.

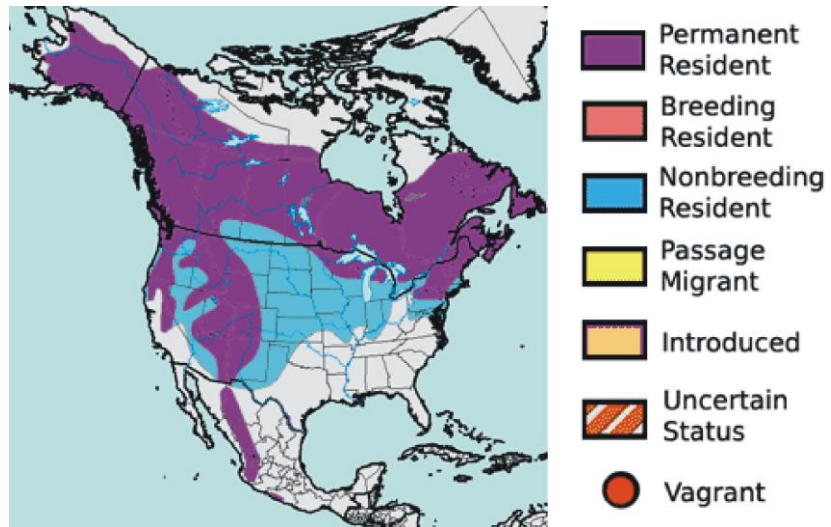
NOT A prediction: e. g., given multiple cover types, goshawks will nest
in mature forest.

Example

Northern goshawks are widely dispersed forest raptors; live, hunt and breed in a variety of forest types (coniferous, deciduous, mixed).



Distributed in the northern hemisphere. In the western hemisphere they can be found across Canada, in Alaska, and throughout the northern United States, south into Mexico along mountain chains.



Field observations show that goshawks tend to nest in mature forest stands, with large trees and high canopy cover, often on north-facing slopes or in drainages near water.



Repeated descriptive studies from many parts of their geographic range in the western U.S. have confirmed this pattern.



So the question is WHY????



Research hypotheses:

Goshawks select nest sites based on favorable microclimatic conditions (i.e., cool, humid areas, which offer protection from exposure to direct sunlight and high summer temperature).

Goshawks select nest sites that offer cover & thus protection from predators.

Goshawks select nest sites that are close to abundant & available prey.

Goshawks select nest sites in close proximity to water because of a need for free-standing water during breeding.

Goshawks select nest sites that are less disturbed by human activities.