Winding up: some final conservation thoughts

- Pleistocene extinctions: Overkill hypothesis
- Modern extinction crisis
- What Orders of mammals are most at risk?
- What characteristics of mammals are associated with extinction risk?
- WNS: a modern zoonotic disease epidemic
- Restoration and reality: can we live with large mammals?
If you were in Illinois, say, 11,000 years ago...

- Giant ground sloth
- American mastodon, 2 species of Mammoths
- Giant beaver (8X larger than modern)
- Wild horse
- Large species of peccary
- Extinct species of musk ox
- “Stag-moose”
- Large species of caribou
- Large species of bison
North America in the Pleistocene
Lines of support for the Pleistocene overkill hypothesis:

- Evidence of human depredation on large herbivores. New hunting technology.
- Largest mammals (most likely targets of hunters) more likely to disappear. Cascading effects?
- Extinctions moved from north to south in North and South America, similar in timing to some models of human southward migration.
- Patterns and timing in other parts of the world indicate this phenomenon happened multiple times. Faunas that co-evolved with humans seem more resistant.

Competing hypothesis is climate change. May be some influence of both. But many of these same species made it through previous glacial cycles.
About 21% of mammal species are listed as extinct in the wild, critically endangered, endangered, or vulnerable by the IUCN (International Union for the Conservation of Nature) Red List of Threatened Mammals.

Major threats for mammals:
1) Loss or disturbance of habitats (37%)
2) Direct extirpation by humans (17%)
3) Invasive species (exotics) (6%)
4) Pollution (4%)
5) Diseases (growing concern) (2%)
Also see table in handout... most species at risk doesn’t necessarily mean highest risk status for Order.

Figure 3.3 Percentage of species threatened in each mammal order. The mean body mass of the orders’ members increases from left to right. The horizontal line gives the average figure for all mammals. Open bars indicate orders with fewer than 10 species, grey bars those with 11–100 species, and black bars those with > 100 species.
Are all extinctions equal? Morally, maybe. Evolutionarily, perhaps not.
Refer to Adam’s lecture for map of the world showing where most species at risk.
Species traits that might increase extinction risk

- Large body size
- Low reproductive rate (life-history constraints)
- Habitat specialist
- Dietary specialist
- Limited geographic distribution
- Small population size
- High trophic levels (fear factor)
- Economic or commercial value
White-nose Syndrome: A Deadly Disease of North American Hibernating Bats
Emerging disease threat: “White-nosed syndrome”

- 1st reported for cave near Albany, NY in winter 2006-2007
- White fungus on head and wings of hibernating bats
- Bats emaciated, poor condition
- Related to deaths of >1,000,000 bats
- 90-100% of bats died in some hibernacula
- Especially smaller species like little brown myotis, Indiana myotis, tri-colored bat

Some population models suggest even common species such as the little brown myotis could become threatened or extinct.
Myotis lucifugus showing symptoms of WNS in a hibernaculum in New York
The relentless spread of WNS since winter 2006 - 2007
Myotis lucifugus (top left) and 2 M. septentrionalis showing symptoms of WNS in caves in Illinois, winter 2013
Myotis lucifugus in flight
Restoration and reality

Every generation is born into a new “status quo.”

- Conserve what remains?
- Rehabilitate and protect habitat?
- Reintroductions?

Don’t just experience the future as it happens.

Think about the world you want and help create it.
What have we lost since 1800?

- Wolf
- Mountain lion
- Black bear
- Bison
- Elk
- Porcupine?
- Marten?
- Fisher?
- White-tailed jack rabbit
White-tailed deer were once extirpated in Illinois, but have increased tremendously in recent decades.
Other come-back stories

Beaver

Recovered on their own after fur trapping declined

Bobcat

Protected in 1972, de-listed in 2004
And some needed a bit more help

River otter

- Trapping season closed in 1929
- <100 left by 1980s, in NW along Mississippi, and far south along Cache River
- Listed as State Endangered in 1989


- Targeted Wabash, Kaskaskia, and Illinois river basins

- De-listed in 2004, populations growing and spreading
What to restore?
All these were here back around 1800...
Ready or not, wolves are returning on their own!

Above: Population estimates and trends for wolves in Minnesota (left), Wisconsin (right, ovals), Michigan (right, triangles) and the Wisconsin and Michigan combined population (right, boxes).

wolf survey data from Wisconsin
Increase in number of packs in Wisconsin, and their spread in distribution from 1979 to 2006. (more now!)

At least 6 wolves known to have dispersed to or through Illinois.

Savanna, IL 2011 trailcam
At least 4 cougars have shown up in Illinois since 2004. Only one escaped alive.

Can we live with wolves, cougars, or bears?
Study questions:

1. What is the Pleistocene Overkill hypothesis? What kinds of evidence are used to support it?
2. What characteristics of mammals make them more vulnerable to extinction? Describe the trait, and explain why it leads to greater risk of threatened status for mammals. Give a mammalian example of each.