

Main Points

1) Overabundance

- biological vs cultural carrying capacities
- success story: stakeholder involvement and the Interagency Bison Management Plan
- mesopredator release
- Example: the economics of Wildlife Services in a fiscally conservative world

2) Test 2 Answers

Tutorial #3 due today at 5pm as a .doc

Terms: cultural carrying capacity, mesopredator release

- cultural carrying capacity = maximum number of individuals an area can support, without “deleterious” effects

The screenshot shows a Mozilla Firefox browser window displaying the website <http://biggameforever.org/wolf-overpopulation.php>. The page features a large banner at the top stating: "Wolf populations have **increased exponentially** reaching **500-700%** of sustainable recovery levels". Below this, there is a section titled "Standing Together Against Wolf Overpopulation" which includes a line graph titled "Wolf Overpopulation". The graph plots "Wolf Numbers" (0 to 4500) against "Year" (1994 to 2014). It shows three lines: "Wolf Actual" (blue), "Wolf Agreed" (red), and "Wolf Plan" (green). The "Wolf Actual" line shows a sharp exponential increase starting around 2002, while the "Wolf Agreed" and "Wolf Plan" lines remain relatively flat and low.

Text on the page includes: "The Canadian Gray Wolf was introduced into Western States in 1994 and achieved recovery objectives in 2002. Wolves are also abundant in Minnesota and Wisconsin. Wolves are here to stay. With a population growth rate of 24%, wolf overpopulation is now doing significant damage to wildlife populations throughout the West and Midwest." A red box highlights a paragraph: "Immediate congressional action is needed to permanently delist wolves and allow for much needed state wildlife management. Ongoing anti-management litigation must be ended to return wolf numbers to agreed upon levels to avoid irreversible damage to big game herds. Sportsmen have invested millions to restore big game abundance. As the original conservationists, working together we can continue to achieve the political and management solutions needed to save big game herds in crisis."

Another red box highlights a table titled "Worldwide wolf abundance-wolves are NOT endangered":

Canada	Alaska	Europe and Asian
50,000 wolves	11,000 wolves	60,000 to 100,000 wolves (estimated)

On the right side of the page, there is a yellow box titled "Sign the Petition!" with a "Sign Petition" button. Below it is a quote: "Wolves took over and became the leading cause of Lolo elk deaths. It wasn't until May of last year that the state could finally manage wolves. By then, the balance of elk and wolves in the Lolo Zone was completely out of whack. Extreme predation on adult females and calves means not enough calves survive to replace the adults that die each year." attributed to Cal Groen, 2010, Director, Idaho Department of Fish and Game.

Overabundance

- **A value judgement characterized by one or more of the following:**
 - when animals threaten human life or livelihood**
 - when animals are too numerous “for their own good”**
 - when animals depress densities of more economically or aesthetically important species**
 - when animals cause ecosystem “dysfunction”**

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Overabundance: Bison in the GYE

- **Globally, bison nearly went extinct in the late 19th century in response to uncontrolled hunting.**
- **Bison in Yellowstone NP (N ~ 5000) are one of two native, free-ranging herds of American bison**



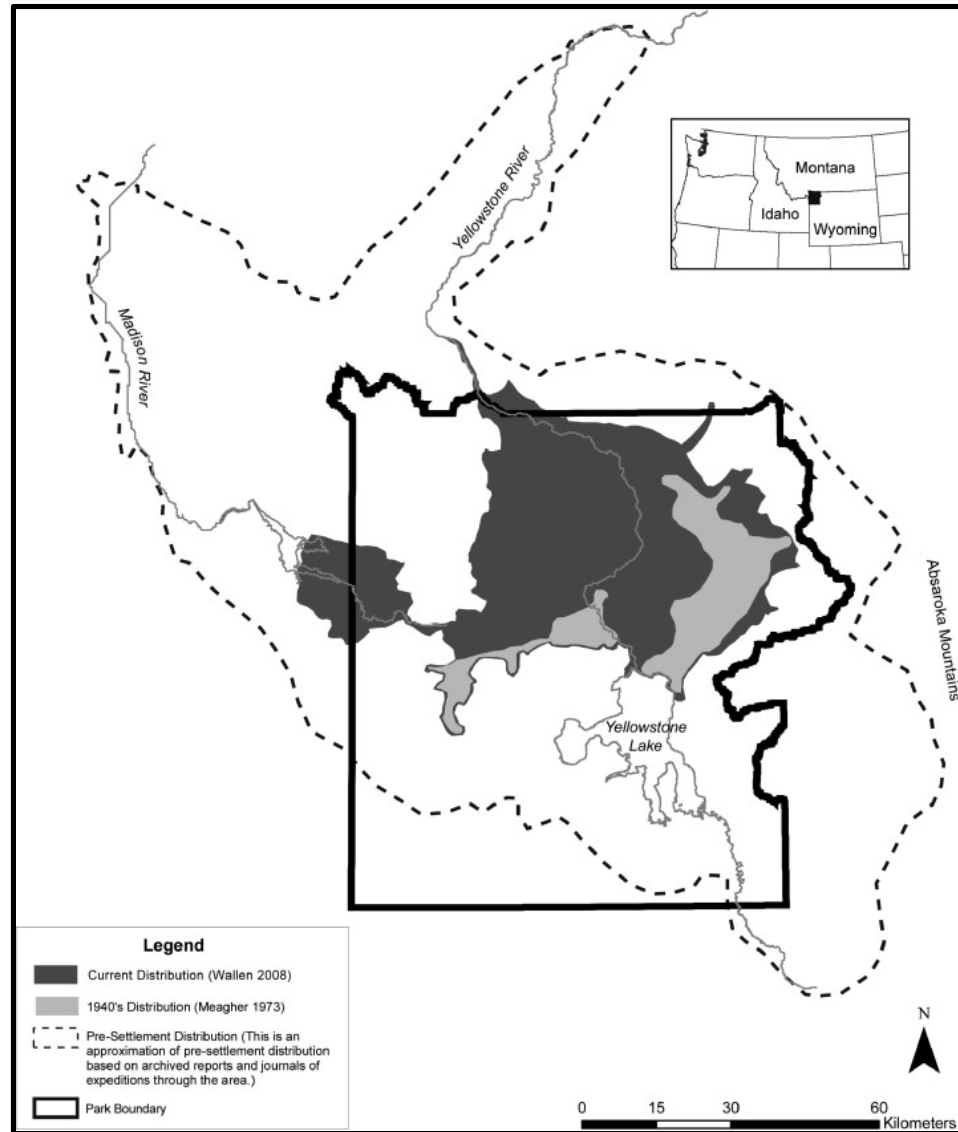
Plumb et al. 2009. Biol. Cons.

Overabundance: Bison in the GYE

- **Bison within the GYE have not exceeded biological carrying capacity, but are close to cultural carrying capacity.**



Plumb et al. 2009. Biol. Cons.



Overabundance: Bison in the GYE

- **Bison within the GYE are variably exposed and infected with *Brucella abortus*, a bacterium causing mothers to abort calves.**
- **On rare occasions, can be transferred to cattle.**



Plumb et al. 2009. Biol. Cons.

- **Interagency Bison Management Plan (IBMP) is a group of stakeholders formed to manage risk of brucellosis transmission to livestock**
(<http://ibmp.info/Library/2008%20IBMP%20Adaptive%20Management%20Plan.pdf>).

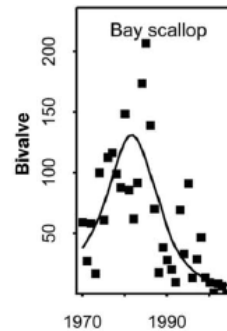
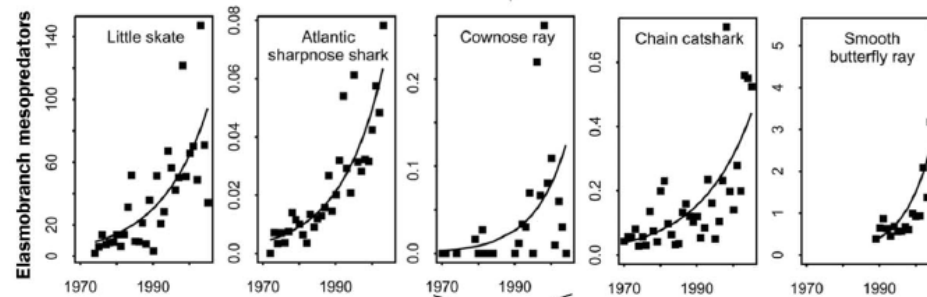
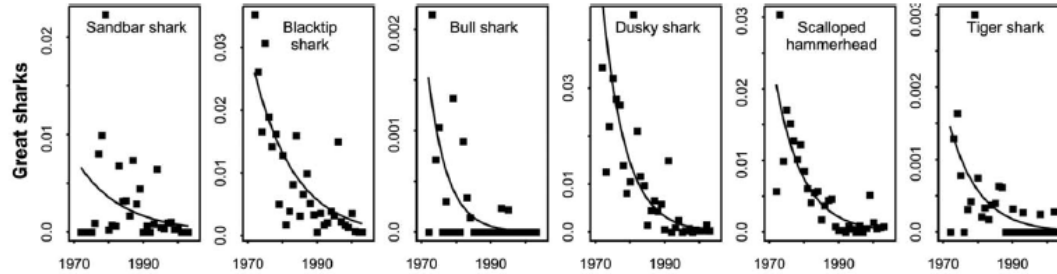
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Unanticipated Consequences of Large Predator Loss

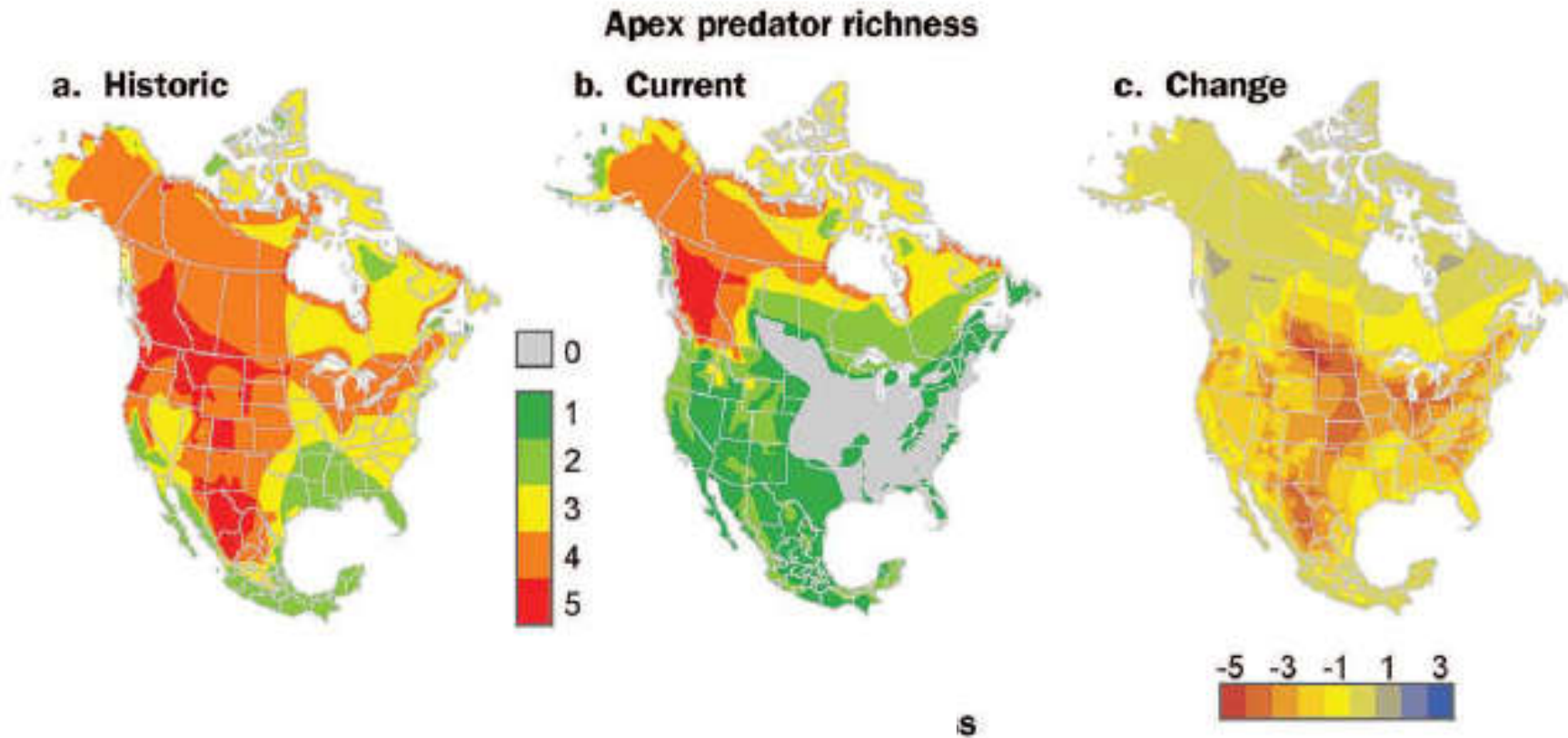
- **mesopredator release** = increase in density or distribution, or change in behavior of mid-level predators following declines of one or more apex predators.
- can result from a trophic cascade, or because of release from interspecific competition with apex predators.

Unanticipated Consequences of Large Predator Loss

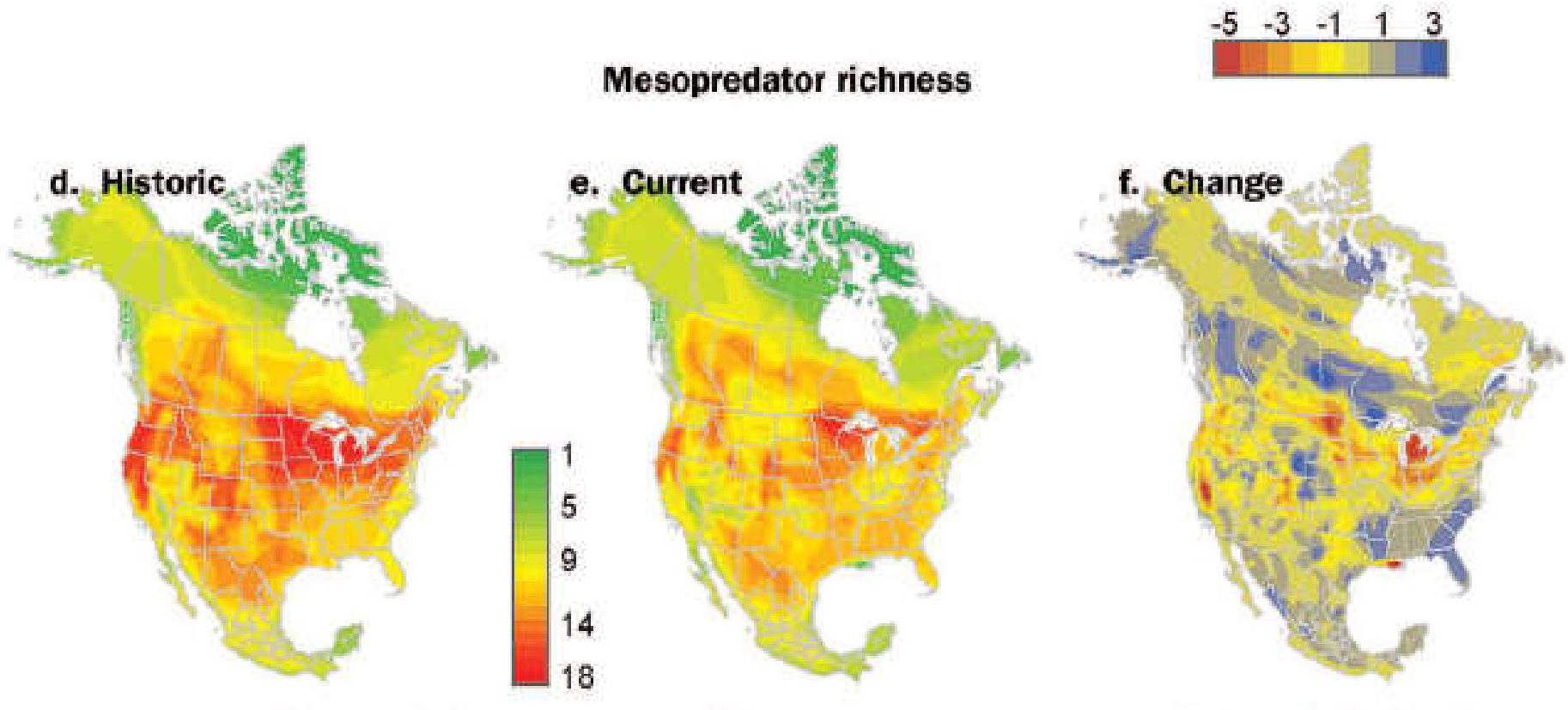


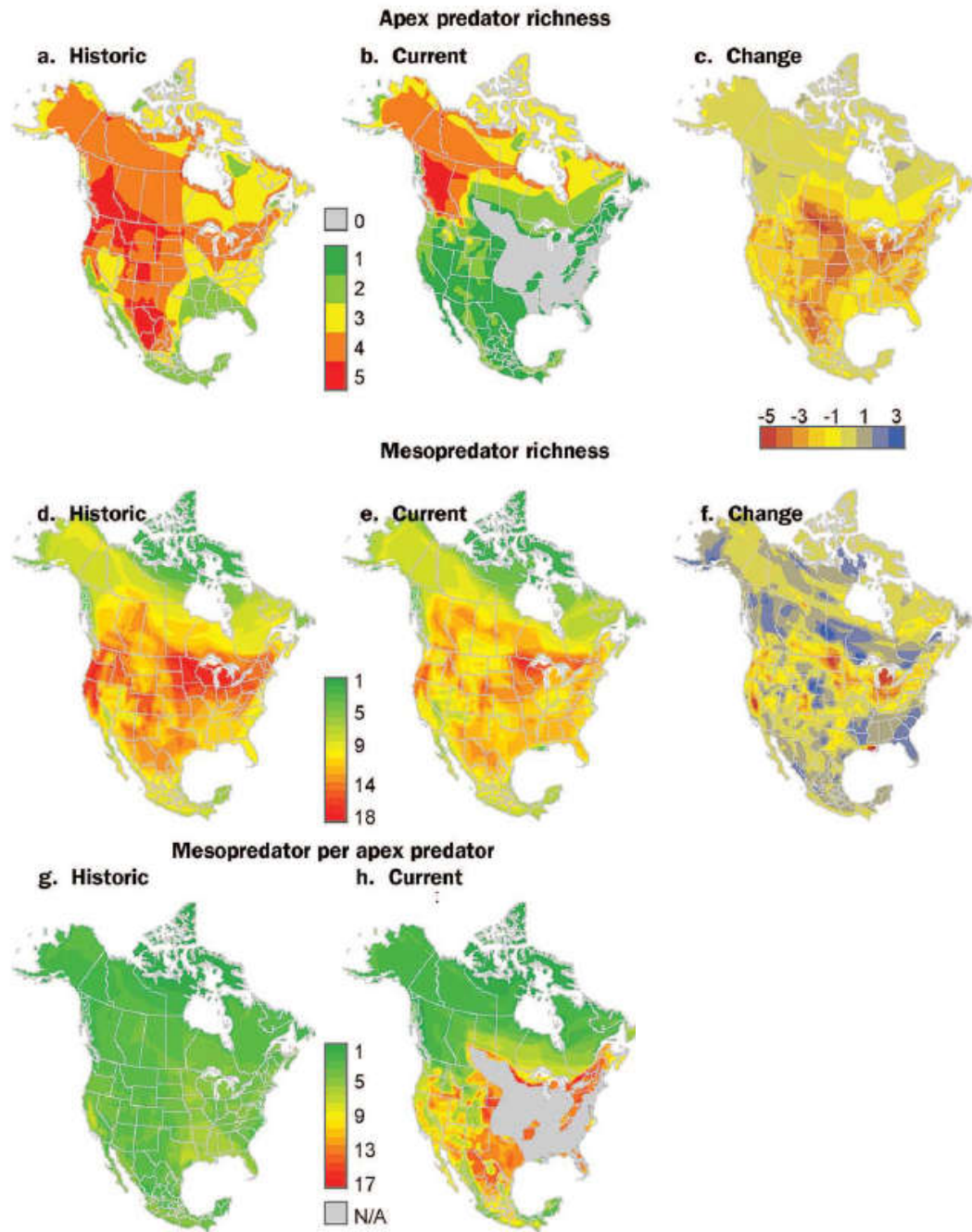
Myers et al. 2007. Science.

Apex Predator Loss in North America



Mesopredator Release in North America

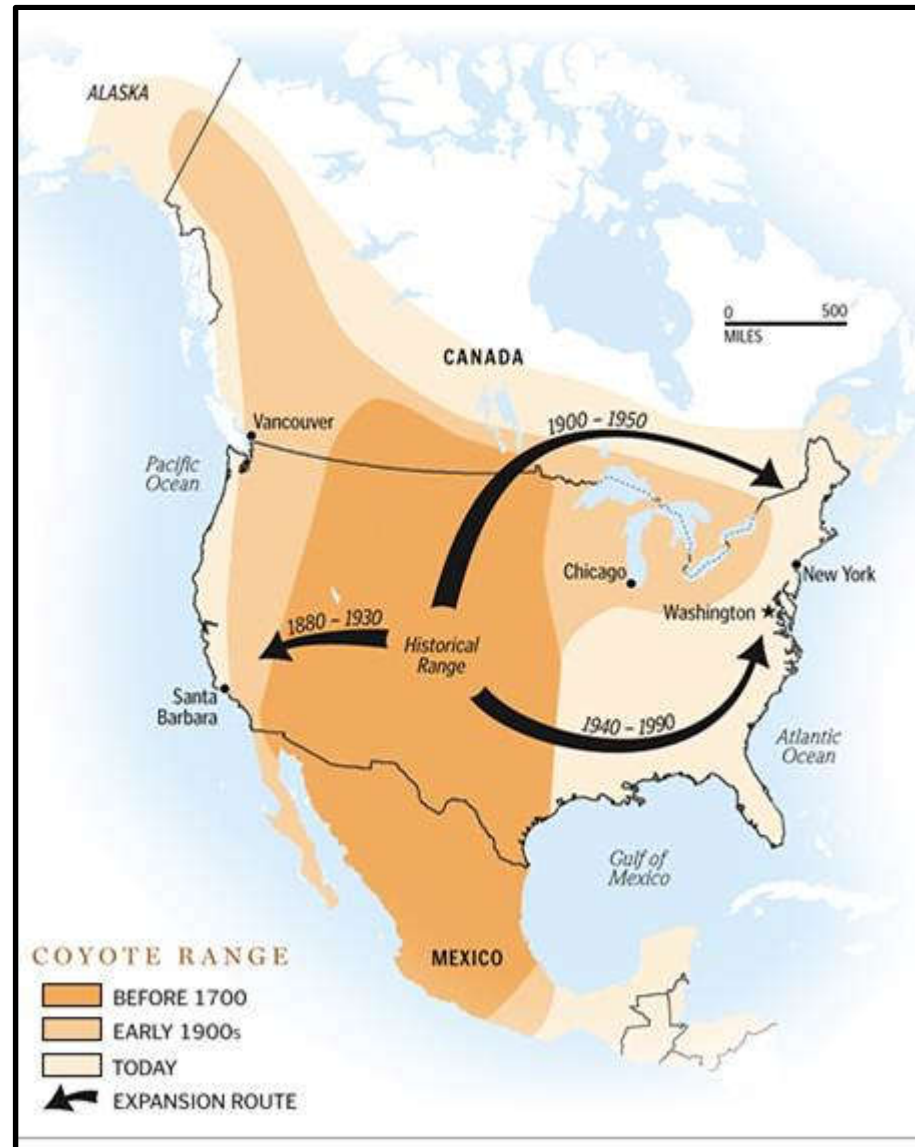




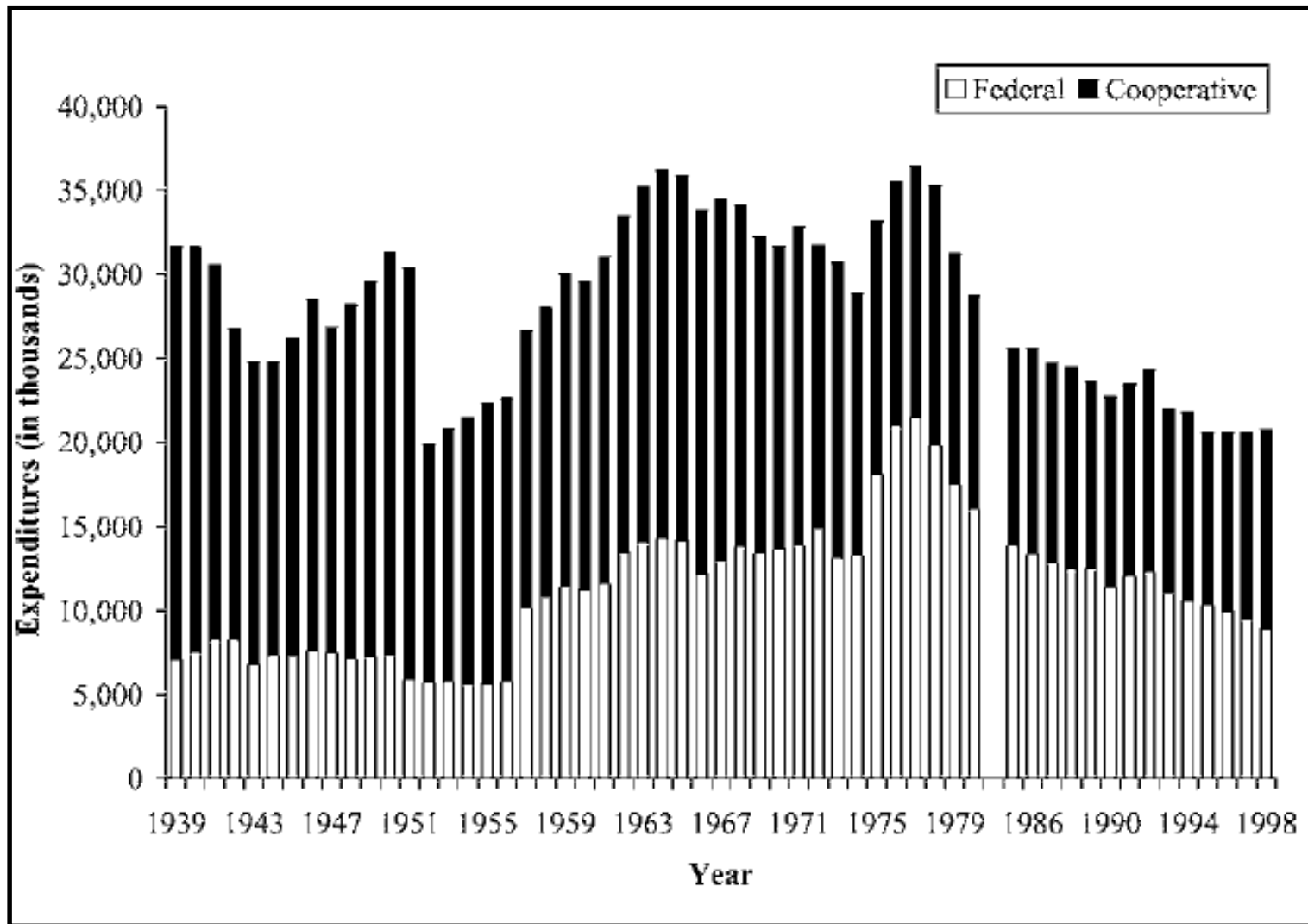
Mesopredator Release in North America

- **Can humans replace the role of apex predators?**
- **Can mesopredators replace the role of apex predators?**

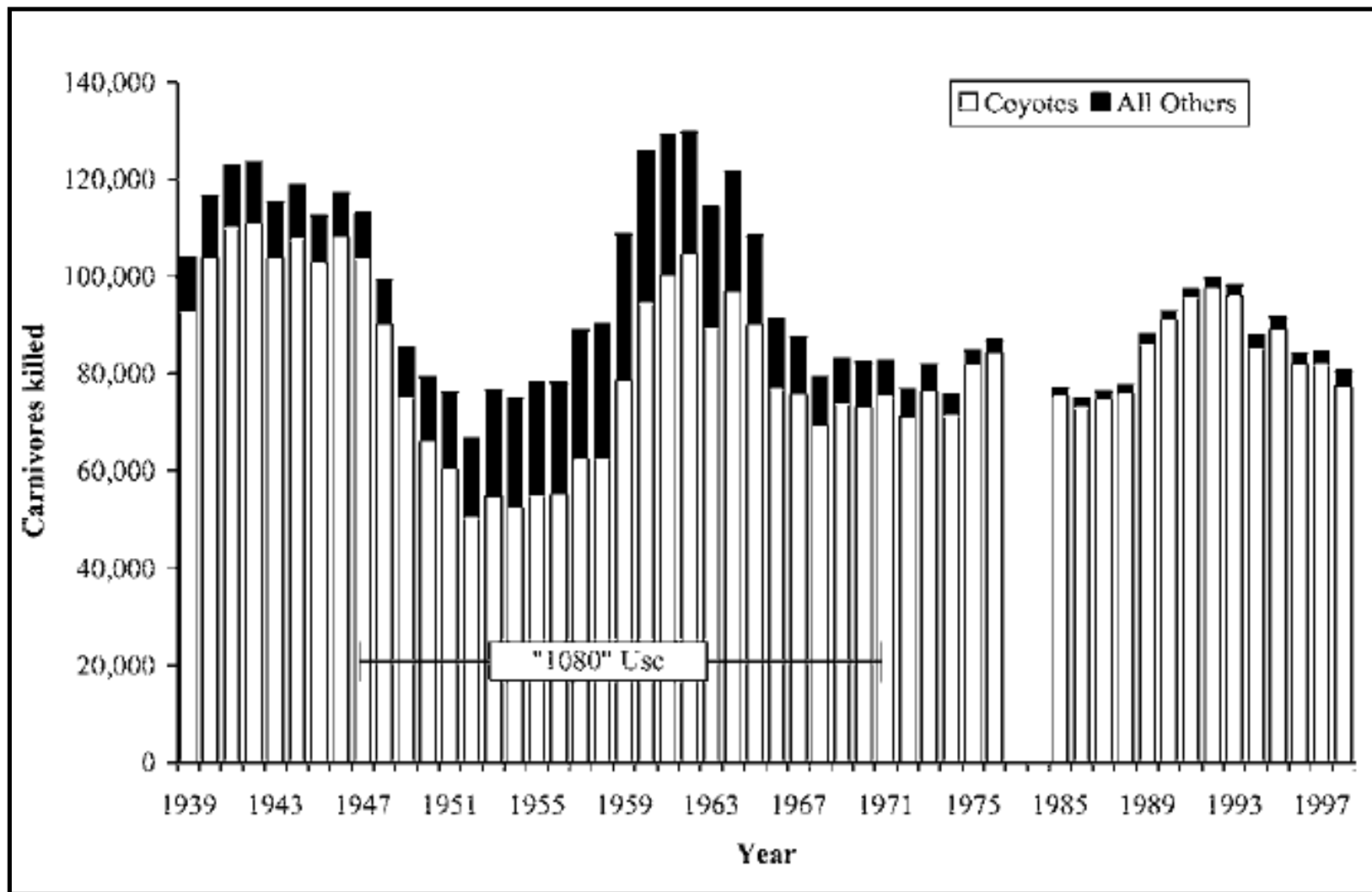
Unanticipated Consequences of Large Predator Loss



Economic Expenditures for Predator Control in the U.S.



Efficacy of Predator Control in the U.S.



Economic Losses of Sheep Ranching: Eastern States Colonized By Coyotes Pre-1950

