Name _____
APES

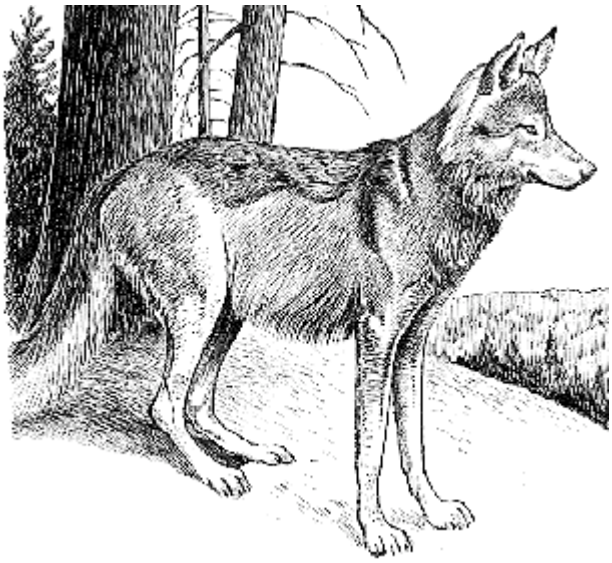
Isle Royale Population Study

Background: Moose where first recorder over a 100 years ago on Isle Royale, this is a small island (45 miles long by 9 miles wide) located in Lake Superior. In roughly 1949, due to a thick ice pack on Lake Superior, timber wolves crossed the ice pack and began to live on Isle Royale. In 1958, one of the longest wolf/moose interaction studies began. Far more information can be found at: www.isleroyalewolf.org or www.wolf.org .

Procedure: You will use the population data to graph the interaction between wolf populations and moose populations at Isle Royale. Put both these lines on the same graph; use a different color for wolves and moose. Make sure to note the y-axis location for each!

Data:

Year	Wolves	Moose
1968	22	1042
1969	17	1268
1970	18	1295
1971	20	1439
1972	23	1493
1973	24	1435
1974	31	1467
1975	41	1355
1976	44	1282
1977	34	1143
1978	40	1001
1979	43	1028
1980	50	910
1981	30	863
1982	14	872
1983	23	932
1984	24	1038
1985	22	1115
1986	20	1192
1987	16	1268
1988	12	1335
1989	12	1397
1990	15	1216
1991	12	1313
1992	12	1590
1993	13	1879
1994	17	1770
1995	16	2422
1996	22	1163
1997	24	500
1998	14	699
1999	25	750
2000	29	850
2001	19	900
2002	17	1100
2003	19	900
2004	29	700
2005	30	540
2006	30	450
2007	21	385



Now this is the Law of the Jungle – as old and as true as the sky;
And the Wolf that shall keep it may prosper, but the Wolf that shall break it must die.
As the creeper that girdles the tree-trunk the Law runneth forward and back –
For the strength of the Pack is the Wolf, and the strength of the Wolf is the Pack.

From The Law of the Jungle by Rudyard Kipling

Year	Wolves	Moose
2008	23	650
2009	24	530

Questions:

1. How much of a time lag does there appear to be between a moose peak and a wolf peak?

2. During what year was there a large wolf dieback? Hypothesize what might have been the cause of this dieback.

3. During what year was there a huge moose dieback? Hypothesize what might have been the cause of this dieoff.

4. Read "Ecological Studies of Wolves on Isle Royale 2006-2007" the 14th page and describe the relationship between Moose populations and the vegetation on the island.

5. Read the article "Moose, Wolves Cling to Isle Royale." What was the true cause of the wolf die off after 1980?

6. Based on the article from #5 above, what was the true cause of the moose die off in 1996?

7. Using what you've learned about the wolves and moose of Isle Royale from the article, describe and give an example of top-down and bottom-up population control.

8. Other than their food source, what other factors contribute to the limitation of moose population?

9. Using what you've read in Chapter 8 about populations curves of cyclic fluctuations or boom-and-bust cycles, and reading supplement 12 on page S46, explain one additional problem that is facing the wolves of Isle Royale.

10. <u>Hypothesize and defend</u> your opinion about what will happen to the wolves of Isle Royale in the next 10 years.

11. On your graph draw a line on where you believe the carrying capacity (K) would be found. Why did you choose this location.

Moose, Wolves cling to Isle Royale

Animals have been studied on the island for almost 60 years

By Anita Weier

ISLE ROYALE -- Moose came to this remote island in Lake Superior at least 100 years ago, probably swimming from the mainland to enjoy a tree-filled paradise without predators.

Then, in about 1949, timber wolves padded across the ice to join them on the 45-mile-long, 9-mile-wide island.

In 1958, U.S. Fish and Wildlife Service biologist Durward Allen launched a study to find out exactly how the two species would interact in an isolated environment. Would the wolves kill off the moose? Would the wolves survive? Would either species develop problems from interbreeding?

Rolf Peterson, a professor of wildlife ecology at Michigan Technological University, has continued the study since 1970, making lengthy visits to the island every year.

Here is a little of what they have learned from what is probably the world's longest-running predator-and-prey research project.

For some years, there was equilibrium between the species. The moose population would build to a high level and then crash if there was a very harsh winter. Wolves would proliferate for about 10 years after a moose peak, as the moose aged and became vulnerable to attack by wolf packs, Peterson explained.

But in the early 1980s, a dog was among the visitors to the island, though they are not allowed. The animal was the apparent source of parvovirus, a dangerous new virus that decimated the wolves, which are still struggling to replenish their numbers: There were 50 in 1980, but now there are only 19.

A moose die-off occurred in 1996, when two-thirds of the 2,000 moose starved to death during an extremely bad winter.

Currently there are about 900 moose on the island, Peterson estimated. The moose will face problems when the balsam fir trees that provide most of their food die off. "Those old trees crash to the ground after 100 years," Peterson said.

Moose are also being infested by tens of thousands of ticks per animal, which has caused many to rub off or bite off much of their hair.

The cow moose defend their offspring against wolves by swimming to smaller, nearby islands to give birth, so the calves are protected from wolves when they are vulnerable.

If attacked, moose back up to a protected area and use their hooves. Wolves try to clamp onto a moose's back legs and latch on until the animal topples. Isle Royale wolves often have broken bones and other injuries from being kicked and bashed against rocks.

"That's how they get their ribs broken. It takes a lot to unclench their jaws," Peterson said of the wolves.

But, on average, just one of every 19 wolf attacks succeeds, usually against the very old or young moose. The predators have better luck with beaver and other smaller creatures.

Throughout the years, the researchers have watched for signs of deterioration in wolves or moose due to inbreeding. No new bloodlines have arrived, so all have common ancestors and are interrelated to some extent.

"Moose were isolated here 100 years ago. Most of the genes are still here, but they have a large enough population (to compensate). There are so few wolves that they have lost genetic variability. The scientific dogma suggests that they are not going to make it," Peterson said.

Only 12 wolves were on the island in the 1990s, but three older females produced enough to keep the packs going.

The wolves have also been helped by natural selection along the way, because the least fit animals die while the strong reproduce.

But a few abnormalities have occurred in wolves in the last two years, Peterson said.

One had asymmetrical neck vertebrae, though the right and left vertebrae should be the same. And one had two fused toes on his two front feet. "He was killed by the pack," Peterson said.

Complete graph on Moose and Wolf populations over time be sure to use only the ranges of each species on the y axis on the right for wolves and the left for moose.

Title: Moose vs Wolf population changes from 1959-2009.