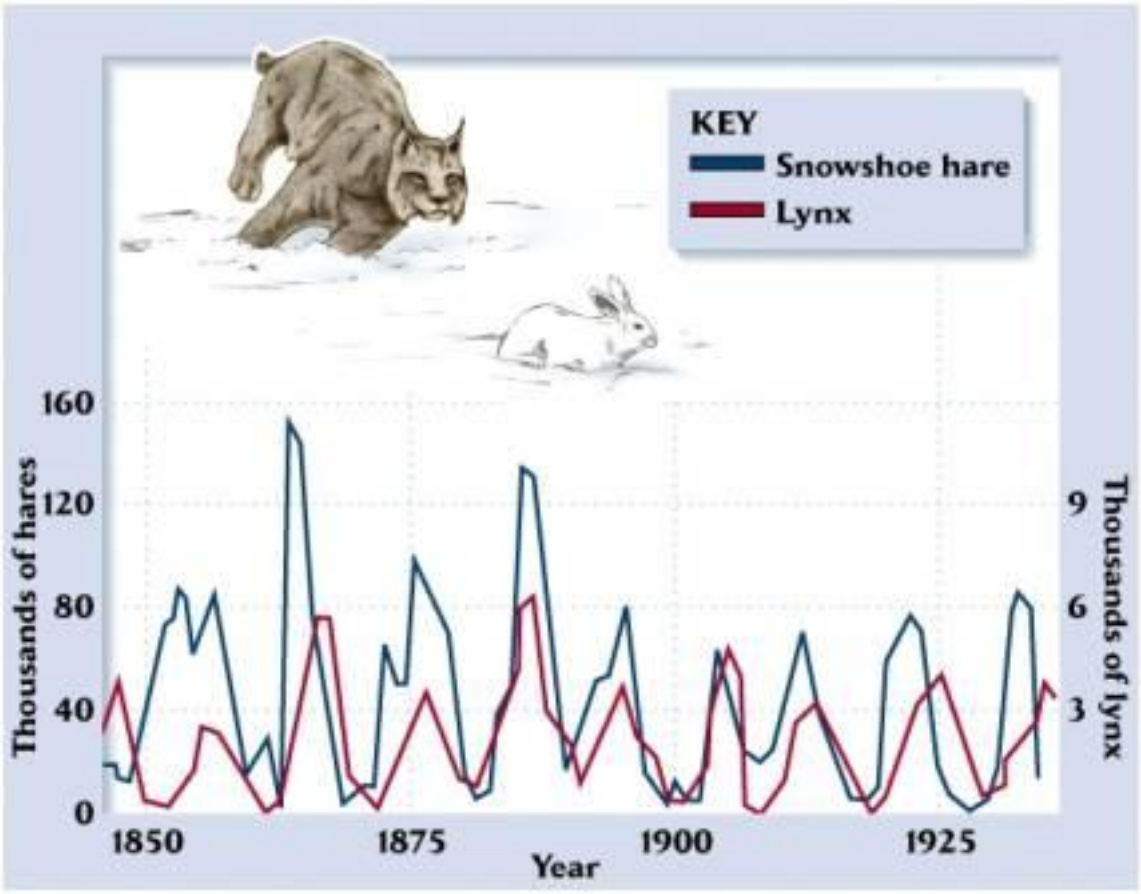
A Summary of Human Population Dynamics
By Russell Hopfenberg

In the broadest sense, the theory is very simple. The main perspective is that human population dynamics do not differ from the population dynamics of all other species.

For all other species, population changes as a function of carrying capacity. Carrying capacity consists of several variables. For example, for many species, carrying capacity consists of: oxygen, food, water, space, predators / disease. I said: "for many species" because trees, for example, need carbon dioxide, not oxygen, and they don't need food per se. Increases in the carrying capacity cause a population increase. Decreases in the carrying capacity cause a population decrease. Arguably, the most dynamic of the carrying capacity variables impacting a population is food.

Here's a classic example in which changes in the food "carrying capacity variable" cause changes in the population.



You can notice that as the hare numbers increase, the lynx numbers follow suit. With an increase in lynx, the hare population decreases. Since this results in a reduction of the lynx carrying capacity, the lynx population then decreases. Look at the Y-axis labels on the left and right. There are thousands of lynx and tens of thousands of hare. These fluctuations are part of the natural course of food and feeder population dynamics throughout the biological community. You might see similar results with hare and vegetation data. These populations are not in overshoot / die-off, they are in dynamic equilibrium.

If there is a sharp increase in the carrying capacity, there will be a sharp increase in the population, but only to the level that it is physically and biologically possible for the species to reproduce. For example, if there were a perpetual increase in the amount of food for bacteria, with unlimited space and no predation, it would take about 24 hours for the bacteria to overwhelm the earth. If we were talking about elephants for the same 24 hour period, there wouldn't be a significant change in their population.

On the other side of the equation, if there were to be a precipitous decrease in the carrying capacity, there would be a precipitous drop in the population. Some have termed this scenario an overshoot, leading to a die-off.

We've all seen signs like this:

We know that it is duck lovers, not duck haters who post these signs. They're not trying to starve the ducks, their trying to help ducks avoid starvation. That may sound strange at first blush. How can "not feeding the ducks" help them avoid starvation? Well, it's common knowledge that having hundreds of tourists feeding the ducks at the lake for 5 years causes there to be more ducks, as the carrying capacity is now increased. Precipitously ending this practice puts the duck population in this habitat in overshoot, and their numbers will decrease to below the new carrying capacity level (a die-off).

Well what about the human species? My thesis is that the same ecological rules apply.

The Agricultural Revolution began about 10,000 years ago and spread to all corners of the globe. On the American continent, this occurred after 1492. Of course, the people living on the American continent before 1492 practiced some form of agriculture. Agriculture is simply the act of fostering the re-growth of the foods you favor. The Agricultural Revolution, however, was something quite different. This revolution holds the perspective that "everything belongs to us." Therefore, trees can be cut down, wildlife can be killed off, and then desired foods can be planted, essentially increasing our carrying capacity.

Imagine if the lynx noticed that the hare population was beginning to diminish. Imagine that they had the ability to have "hare farms" the way we have chicken farms. What would happen to the lynx population if they never allowed the hare population to decrease or stay static – but only increased it?

The lynx population would only increase.

The lynx population would boom. The number of lynx would increase to the potential enabled by the new supply of hare-meat -- and no more.

Now imagine this increased amount of hare-meat, sufficient in quantity to fuel aggregate population growth in the lynx community, was not fairly distributed amongst the lynx community. Some lynx had more than enough, even to the point they regularly became obese. Meanwhile, many lynx had just barely enough hare-meat to survive. Some, in fact, did not get enough hare-meat at all, such that many thousands of lynx actually starved every day.

It would not be hard to imagine that millions upon millions of lynx, conscious of their fellow lynx dying of starvation would come to strongly believe a strange notion -- that they must

increase the number of hare farms in order to feed a growing lynx population. They would perceive the observed starvation as a clear signal that there was already not enough hare-meat.

The incontrovertible truth was that ever-increasing hare-meat was the fuel enabling the reality of lynx population growth. However, the mal-distribution of hare-meat was just as real; and, it simulated the circumstances of a hare-meat *shortage* to the lynx that saw their fellow lynx starve. Not surprisingly then, these horrified lynx would advocate for *more* hare farms, with the goal of producing more hare-meat. In turn, the new increase in hare-meat supply would fuel more aggregate lynx population growth. Eventually, this cycle would be disastrous for the lynx as, at some point, the ecosystem could not sustain a world consisting of only lynx and hare.

As people who have been born into the culture of the Agricultural Revolution, we have inherited the notion that we must increase food production to feed a growing human population. We also maintain the idea that we must increase our food production to feed the starving and malnourished. The former notion is belied by thermo-dynamics: population would not be growing -- ***could not be growing*** -- without sufficient calories to fuel the growth. The latter notion is the result of good people witnessing the horrors of malnutrition and starvation, foisted upon the human community by inane politics and heartless economic decisions. While global food distribution is a function of politics and economics, increasing food production serves only to increase all segments of the population, including the poorest of the poor.

It is my position that the issue of human overpopulation and related environmental problems will be effectively addressed, and positive solutions found, only through our maintaining the scientific perspective that human population dynamics are no different than the population dynamics of all other species. Whatever exceptionalism one may feel necessary to attribute to the human species, it cannot be based on the renunciation of this singular truth: that our population size and future dynamics are completely dependent on the calories available to us.

Our population would not be growing unless there were already enough calories to fuel the survival of existing people and of new, viable generational cohorts. Continuing to increase the calories available to humanity ensures, ceteris paribus, continually growing human population. This is the exact same dynamic of more hare-meat enabling the growth of the lynx population. And, without profound political and economic reforms, this ensured human population growth will simply scale up our current system of mal-distribution, simultaneously ensuring an ever larger cohort of mal-nourished and starving people.

I hope you'll feel free to peruse the www.PanEarth.org website and view the videos and papers available there.