Conservation Biology

Editorial

What Every Conservation Biologist Should Know about Human Population

At the 25th meeting of the Society for Conservation Biology in 2011, Thomas Lovejoy was asked in the opening plenary session why few talk about human population as the root of environmental degradation. The question is a reminder of how little conservation biologists have incorporated current understanding of human population into their everyday thinking about environmental problems. We are not the first to highlight human population in this journal (Grossman 2010; Prichard 2011). However, we would like to highlight some of the most critical points about human population from a human-demography perspective.

First, human population has only recently become an environmental problem. Before 1800, there was no sign of an approaching population crisis. Mortality and fertility were high, with life expectancy at birth around 35 years and a total fertility rate over 6 births per woman. Thus, there was little to no population growth and the world's population was less than one billion. Such a small population could have consumed unlimited resources for a long period of time and not faced today's environmental problems.

However, in the early 1800s mortality began to decline in more developed countries. People began to live longer due to improved sanitation and water supplies, better hygiene, and higher living standards. Mortality began to decline in less developed countries about 100 years later. The same factors, along with medical interventions such as immunizations, reduced mortality rapidly. Today global life expectancy at birth is 70 years [PRB 2011]. However, fertility remained high and there were many more births than deaths, which resulted in population growth. Living longer is widely seen as a desirable achievement, but it was this achievement that brought population growth.

Second, the world population growth rate peaked in the early 1960s. In fact, it was already declining when Paul Ehrlich (1968) published *The Population Bomb*, which brought widespread attention to the negative effects of population. By the time conservation biologists were calling attention to the "missing agenda" of human population control in this journal (Meffe et al. 1993), population growth rates had already been declining for 3 decades.

The population growth rate declined because fertility began to decline. Fertility began falling in the late 1800s in more developed countries and around 1950 in less developed countries. Fertility declined for a variety of reasons, but one important reason was the decline in mortality (Mason 1997). Because parents became confident their children would survive, they reduced births to achieve their desired family size. Today the global total fertility rate is 2.5 children per woman (PRB 2011).

Third, this pattern of population change, known as the demographic transition, is universal (Bongaarts and Bulatao 2000). Once the demographic transition begins, the path to a stable, larger population, characterized by low mortality and fertility, is a matter of time. More developed countries have completed the demographic transition and most less developed countries are nearing the end of it. Sub-Saharan Africa stands out as the only region where fertility has not yet declined substantially. Scherbov et al. (2011) estimate there is an 84% probability that world population growth will end by 2100. The United Nations (2011) forecasts a population of 10.1 billion for 2100, although the pace of remaining fertility decline will determine the eventual population size. If fertility declines faster than currently anticipated, it is likely that the global population will peak and then decline substantially by 2100 (UN 2011).

So, here we are in 2012 with a world population of 7 billion. The good news is the growth rate is falling rapidly, world population is stabilizing, and it should never again double in size. And – here is the fourth point –the world has survived the population bomb by coming through the last 50 years of rapid growth much better than predicted in the 1960s (Lam 2011). So far, neither mass starvation nor economic collapse has come to pass as was predicted. The bad news is the population will stabilize at a much larger size than that of before 1800.

Given today's demographic context, how might conservation biologists constructively approach the issue of human population? Conservation biologists could call for and support the following policies and programs.

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1. Maintain support of family planning. Now that fertility has declined to 2.5 children per woman, the population agenda is largely seen as complete by the international community. Thus, family planning was not included among the Millennium Development Goals. However, there is still an unmet need for contraception. The proportion of women in unions who want to avoid a pregnancy, but are not using contraception, is as high as one-third in some Sub-Saharan countries (ORC Macro 2012). Worldwide, this translates into 215 million women with an unmet need for contraception (Singh et al. 2009). Furthermore, access to contraception needs to be maintained in the future. Maintaining such access will help women realize their reproductive choices and minimize population growth.
2. Move the population and environment agenda toward population distribution and composition. The notion that population is the root of environmental problems has focused on population size; that is, people are bad for the environment and the more people there are, the worse it must be. However, connections between population size and the environment are complex and shaped by a host of mediating factors (Axinn & Ghimire 2011). Some of these factors are other aspects of population, namely the distribution of populations across space and their composition. For example, the concentration of people in cities or away from key habitat can reduce environmental effects (Hunter et al. 2003). Furthermore, the number of households is more strongly associated with consumption than the number of people (Liu et al. 2003). In turn, the household composition of a population is important. Thus, the focus on population size should shift to a more comprehensive approach to population.
3. Address consumption separately from its connections to population size. The challenge now is consumption. Addressing this challenge, it can be argued, has too often been derailed by the call to reduce population growth. Our understanding of how and why population growth has changed over the last 2 centuries may provide some clues to how consumption patterns may change. Most people did not reduce their individual fertility because they had a worldview that population growth was a global problem. Instead, fertility declined for many varied and context-specific reasons, but a core component was that people were making individual, rational choices that met their needs (Mason 1997). The pathways to reduced consumption will probably also be numerous and context-specific, and ultimately, people will make individual choices that make sense in their social and economic environment. (Pearce 2012).

As with population issues, conservation biologists should ensure that we, as individuals and a professional society, understand the current state of knowledge about consumption and encourage constructive dialogues on consumption and its effects on biodiversity. We are not the first to highlight the issue of consumption (Baltz 1999) in this journal. Although conservation biologists may debate whether U.S. consumption is excessive (Ehrlich & Goulder 2007), the answer is more clear to some. Two months after the 2011 Society for Conservation Biology meeting mentioned above, the first author was in India attending a presentation by Elinor Ostrom (2012), who won the Nobel Prize for her work on management of the commons. At the end of the presentation, a participant asked Dr. Ostrom how we can get the world to talk about consumption as the root cause of the world's environmental problems. This is the question conservation biologists should ask more often.

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