

## Over Population

To understand why over population is a growing concern; we need to look at the big picture. We must look at the population of the entire planet. In 2002, the population growth rate was 1.3, the total population was 6.4 billion people and the expected population in 2050 was 8.9 billion people<sup>1</sup>. More recent data from 2006 indicates the population growth rate is 1.1, the total population is 6.5 billion people and the expected population in 2050 is 9.0 billion people<sup>2</sup>. So, even though population growth has slowed, the result is still an even greater estimated population in 2050.

This huge expected increase in population will take an even greater toll on the planet's natural resources. We need to look at the effects of population growth so far. Nierenberg and MacDonald argued that increased population and its associated increased consumption have taken a heavy toll on four critical natural resources: the atmosphere, the forests, the fisheries and the farmland<sup>3</sup>. Two that they did not discuss, clean water<sup>4</sup> and biodiversity<sup>5</sup>, are also critical.

The toll on the atmosphere is air pollution, which comes from industrialization and increased population<sup>6</sup>. Air pollution kills 3 million people each year<sup>7</sup>. Three historic events have made air pollution a major worldwide issue:

**1948 Donora, PA** - Pollution from a Zinc smelting plant killed 20 and caused over 5000 illnesses when sulfur dioxide, carbon monoxide and heavy metals were trapped by weather conditions in a narrow valley.

**1952 London England** - 4000 Londoners died from pollution when air became stagnant and the temperature dropped rapidly. The primary heating source was coal, which filled the air with ash, sulfur oxides and soot.

**1997 Indonesia** - Using slash and burn agriculture 20,000 hectares burned during the dry season. 20 million Indonesians were treated for illnesses from the resulting smoke and soot. Visibility was so poor an airliner crashed killing 234 people.



Photo 1: Mexico City



Photo 2: Xi'an China

Air pollution is made up of chemicals released into the atmosphere (carbon monoxide, sulfur dioxide, ozone) and particles released into the atmosphere from industrial processes, vehicles and construction (heavy metals: asbestos, arsenic, copper, lead and zinc, plus smoke soot and dust). The chemicals released react with sunlight to form smog either brown or grey in color. Physicians link this with increasing respiratory illnesses. To avoid the health risks associated with smog you should only go outside in the early mornings and in the evenings. Mexico City with a population of 25 million has one of the worst smog problems in the world (Photo 1). China also leads the world in air pollution (Photo 2). Health problems posed by particulates are dangerous as well. The particles accumulate in the lung and if small enough, they are actually absorbed into the blood stream, where they remain for a long time.

The US as an industrialized leader, recognized the air pollution problem in the 60's. The response was a number of laws enacted to improve the quality of the air we breathe<sup>8</sup>:

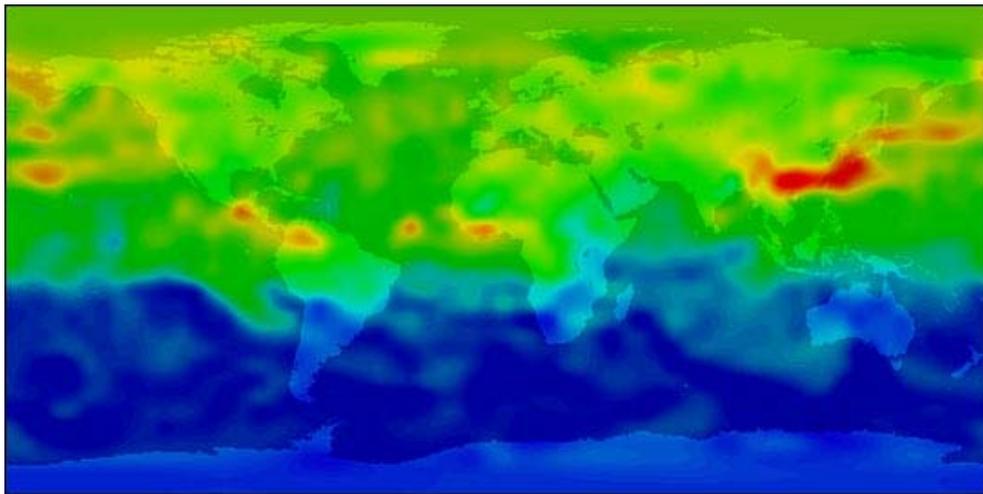
1963 The Clean Air Act

1967 Air Quality Act

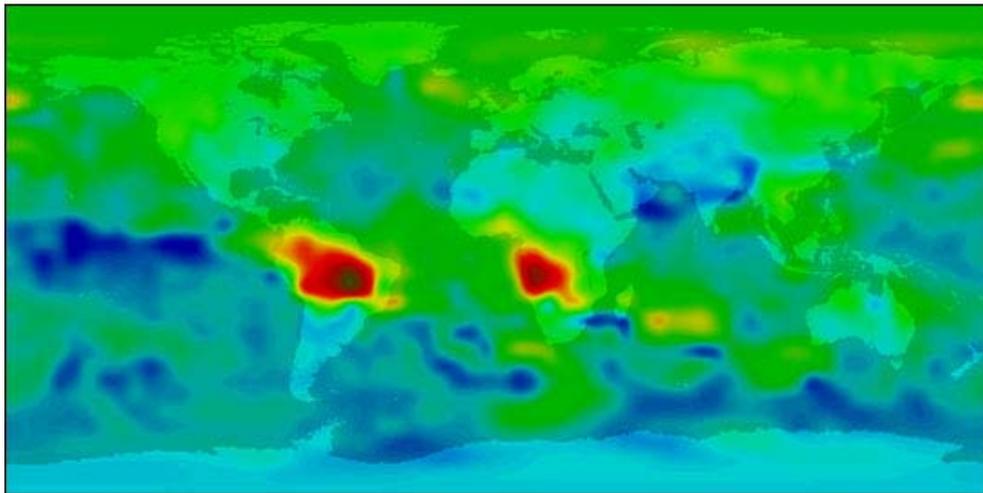
1970 Clean Air Act Extension

1977 and 1990 Clean Air Act Amendments

The laws had two responses. Technology was developed, called scrubbers, to clean harmful waste pollutants from industrial processes. Dirty industries moved out of the country to the third world where no pollution laws existed. Air pollution now circles the globe and its strength varies depending on the time of year, due to seasonal variation of plant life (Map 1).



April 30, 2000



October 30, 2000

Carbon Monoxide Concentration (parts per billion)

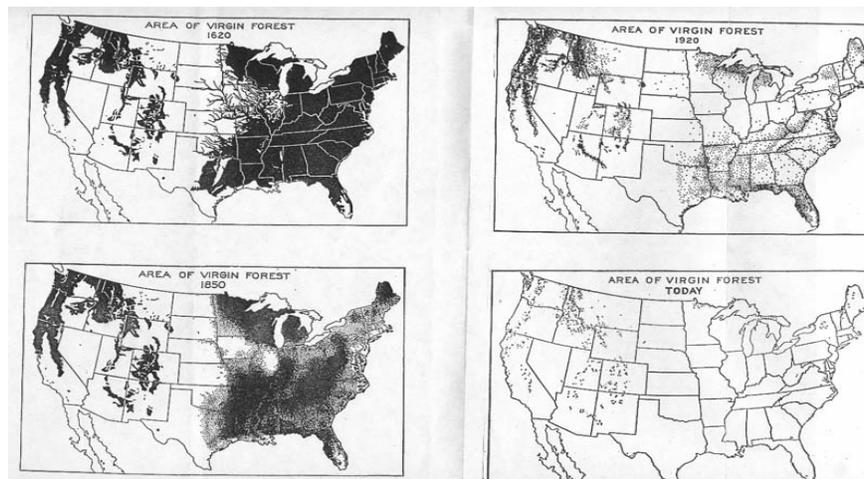


Map 1: Pollution Circles the Earth



Photo 3: Jungle burned for agriculture in southern Mexico

Forests are Earth's natural sequestration mechanism for pollution in the atmosphere and giving us clean air to breathe. With the growing need to feed more and more people and the increased demand for wood products, deforestation has and is increasing world wide. Nierenberg and MacDonald state, "Half of the worlds original forest cover is gone and another 30% is degraded or fragmented." (See Photo 3 and Map 2.)



Map 2: 400 years of Deforestation in the US

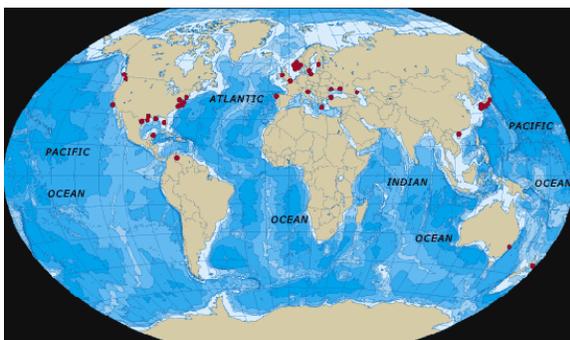
On top of losing their air purification process, tropical forests provide habitats for half or more of the world's species and appear to influence global climate<sup>9</sup>. The loss of habitats reduces biodiversity, which lowers the resiliency of the ecosystems ability to adapt to change. Tropical

rainforests have supplied many beneficial products from medicines to natural biological control agents for agriculture.

Deforestation also reduces the lands ability to retain moisture, which increases the risk of flash flooding and carries off soil. Deforestation slows the process of ground water recharge. Surface water runs off faster from flat surfaces such as fields cleared for agriculture than irregular surfaces like the forest floor. This decreases the ability of the water to percolate down into the water table, thus reducing the overall supply of fresh water<sup>10</sup>.

Only 2.5% of the water on the earth is fresh water and of this, we use 70% in agriculture, 15% in industry and the remaining 15% is household use<sup>11</sup>. Demand for clean water is soaring as population increases. Estimates predict that when the population increases to 8 billion, 48 countries will face water shortages affecting approximately 3 billion people<sup>12</sup>. Thus, with such a limited resource water pollution is a hazard to sustaining life on Earth. Currently unclean water and poor sanitation kills 12 million people each year<sup>13</sup>. Rainwater filtering through waste dumps picks up contaminants that are carried down into the water table, making the water unfit for drinking. Excessive extraction of water from wells along coastlines, can depress the water table to such a degree that saltwater intrusion renders the water undrinkable<sup>14</sup>.

Agriculture irrigation and rainwater runoff is a serious issue as well. Water runoff from



Map 3: Dead Zones

cultivated areas carries sediment containing pesticides, herbicides and soil. This polluted runoff eventually reaches the oceans, creating dead zones<sup>15</sup> that no longer harbor any life (Map 3). The oceans, rivers and lakes are not the only things affected by

agricultural pollution, the land and animal life, including people, are also affected. DDT, a pesticide, was widely used until we discovered that it had long term effects on bird populations because it caused thin egg shells, thus lowering their reproduction. It especially impacted bald eagles, osprey and pelicans. The US outlawed the use of DDT; however, we still produce it for shipment to the third world. Although people in developed nations may believe, they are free from the effects of DDT, it is in fact still flowing back into these countries in the form of agricultural products from the third world<sup>16</sup>.

As population increases, the need to increase food production must increase as well. The 19<sup>th</sup> century saw a significant increase in agricultural productivity, mainly due to technological breakthroughs in pesticides and herbicides, and in industrialized machinery to plant and harvest crops. However, this rapid productivity increase in food production has ground to a halt. From 1950 to 1997 the world grain harvest tripled to about 1,990 million tons. Since 1999 production has fallen behind consumption every year<sup>17</sup>. Population growth is outpacing demand for the last 5 years running. In 1798, Malthus predicted that population would out run food supply<sup>18</sup>, and it certainly looks like this is now coming true.

As the demand for housing increases with population growth, more and more fertile land is lost to urban sprawl. China is a good example of what is happening worldwide. Spreading cities reduce the available fertile land for crops, soil erosion from over cultivation decreases agricultural productivity, and water needed for irrigation is drying up<sup>19</sup>. Excess population is pushing more and more subsistence farmer onto marginal land because all of the fertile lands are already in use. These lands have relatively thin poor soils and are located on steep slopes. Farming on marginal land results in soil degradation and increased soil erosion, which means eventually there will be no soil left and no crops will grow there. This process is called

desertification. This process also occurs when animals overgraze rangelands. In northern China, grasslands were overgrazed and then some of these rangelands were converted into croplands. This process converted some 65,000 km<sup>2</sup> of once productive land to desert. Worldwide 6 million hectares of land per year are lost to desertification<sup>20</sup>.

Not only is agriculture no longer keeping up with demand, fisheries are depleted as well. The industrialization of the fishing industry has resulting in a 90% loss of all the large ocean predators<sup>21</sup>. 12 of the 13 major fisheries are now severely depleted<sup>22</sup>. An example of depleted fisheries happened in western South America, when anchovy catches severely dropped the population had to make up for the dwindling food supply. When the ocean can no longer provide sustenance for coastal populations, changes had to be made. Huge coffee plantations were ripped out and replaced with food crops. Thus, price of coffee worldwide skyrocketed. Over fishing has brought world fish stocks to dangerously low levels. As northern hemisphere stocks were fished out the commercial fished fleets headed south. Too many boats are chasing too few fish now and the oceans may never recover<sup>23</sup>.

It is not just the impact on the world's environment due to over population; it is the state of the population itself. Worldwide millions of women still lack access to modern methods of birth control. A million girls are still marrying before their 18<sup>th</sup> birthdays, some as young as 8 and 9 years old<sup>24</sup>. Nierenberg and MacDonald state, "Early childbearing is the leading cause of death and disability for women between the ages of 15 and 19 in developing countries." Population growth in countries where equality between men and women lag have the highest growth rates in the world. Nierenberg and MacDonald point out Niger with a fertility rate of 8 children woman. Kenya has a rate of 5.0 and Ethiopia has a rate of 5.6. Kenya has closed five family planning

clinics due to a loss funds from UNFPA aid. In Ethiopia, less than 6% of the women have access to modern birth control methods.

Even in the US, women's reproductive rights are being restricted by increasing regulation. The US gag rule on the topic of abortion is having global implications. The withholding \$34 million in funds for the UNFPA has reduced money flowing to third world countries if they continue to discuss and offer abortion as an option in family planning clinics, as Kenya refused to do. As the need for aid for women reproductive choices increases, the amount of funds available has been decreasing. Consequently, the world population is still growing.

More and more people are migrating in search of a means to support and feed themselves and their families. The demographics of migration are changing. The UN State of the World Report for 2006 summarizes the issue of population migration. Even greater numbers of women are now doing what men once mostly did. Nearly half of all migrants are now women. Migration can be voluntary or forced. Trafficking in women and the exploitation of domestic worker are increasing. Global migrants seeking asylum and refugee status are on the rise. Migration issues go hand in hand with over population issues.

Thus, we have to ask ourselves some very important questions about the future. How will we be able to feed 9 billion people in 2050? How many more people will suffer or die from increased levels of pollution in 2050? With the rate of consumption of our natural resources, will we be are war over clean water or food in 2050? What is the true carrying capacity of the earth? Have we already reached it? These issues require value judgments and depend on what quality of life we are willing to accept. If we want to raise the quality of life worldwide to the standard of the US, Nierenberg and MacDonald indicate we will need the resources of three more planets. Curbing population and sustainable resource use are necessary for our future survival.

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## End Notes

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- <sup>1</sup> Nierenberg and MacDonald, page 11
- <sup>2</sup> UNFPA, page 98
- <sup>3</sup> Nierenberg and MacDonald, page 11
- <sup>4</sup> Strahler and Strahler, pages 519-538
- <sup>5</sup> Molles, page 570
- <sup>6</sup> Thompson and Notestien
- <sup>7</sup> Hinrichsen and Robey, page 49
- <sup>8</sup> Botkin and Keller , pages 525-530
- <sup>9</sup> Molles, page 570
- <sup>10</sup> Strahler and Strahler, pages 519-538
- <sup>11</sup> Water Resources
- <sup>12</sup> Hinrichsen and Robey, page 49
- <sup>13</sup> Hinrichsen and Robey, page 49
- <sup>14</sup> Botkin and Keller , page 520
- <sup>15</sup> Strahler and Strahler, page 223
- <sup>16</sup> Strahler and Strahler, page 228
- <sup>17</sup> Lean, page 62
- <sup>18</sup> Malthus
- <sup>19</sup> Lean page 63
- <sup>20</sup> Botkin and Keller , page 233
- <sup>21</sup> Nierenberg and MacDonald, page 11
- <sup>22</sup> Eldrege, page 77
- <sup>23</sup> Montaigne
- <sup>24</sup> Nierenberg and MacDonald, page 12