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Environment and Human History - Earth Day 2008

by Alan Singer, editor, *Social Science Docket*

In April 2008 I was invited to be the keynote speaker at a high school Earth Day convocation in a relatively affluent suburban community. Approximately 200 high school seniors from Participation in Government and advanced placement U.S. Government classes participated. For the first hour-and-a-half students were expected to watch the Academy Award winning documentary, *An Inconvenient Truth* (2006). I had been asked to tailor my remarks to the movie. The essay that introduces this thematic issue of *Social Science Docket* on "Environment and History," is based on a speech that I never delivered. I abandoned it as I saw more and more students lose interest in the documentary on global warming, talking with neighbors, or "texting" friends (the darkened assembly began to look like a star-studded sky on a clear night). When the overhead lights went on I asked students to stand and move around a bit. After order was restored, I simply said: "I know Al Gore is boring, but I don't think global warming is. I would really like to hear what you have to say about global warming and other threats to the environment. You can refer to the movie, or not, depending on what you want to say."

For the next hour, dozens of students stood at microphones scattered through the assembly and addressed the issues. No one disputed the fact of global climate change. Their major focus was on three vital questions: "What could environmentally conscious individuals do to reverse global climate change?"; "Will pro-environment policies address the problem of widespread poverty around the world?"; and "Does the United States have to choose between the environment and the economy?"

During the course of the discussion, I tried to respond to student questions. I argued there is a difference between individual behavior and collective social action. While an individual "green" lifestyle is commendable and everyone who drives should drive small hybrid cars, only collective social action can change the way our society, and other societies, operate. The Earth needs "green" people, but also a "green" movement. Because global warming is a transnational problem that cannot be effectively addressed by individual countries, ending environmental

destruction will require international cooperation and new levels of economic, social, and political integration. While this campaign will not automatically solve the problem of income disparity and intense poverty, it will create the international mechanisms needed to address these problems.

The question, whether the United States has to choose between the environment and the economy was my original topic and it is not an easy question to answer. I think the United States, Western Europe, and the industrializing world (especially China and India) have to make serious economic choices, but former Vice-President Al Gore and many others think global warming can be reversed without major structural changes, if we have the necessary will power.

This is a major question, perhaps the underlying question, in this thematic issue of *Social Science Docket*. The opening essay looks at the relationship between globalization and global warming and argues that minor adjustments in human behavior do not address the magnitude of the environmental crisis. "Can Capitalism Resolve the Global Climate Crisis?" focuses on the relationship between capitalism and global warming and includes comments by teachers from the New Jersey and New York Councils for Social Studies. Frank Maniscalco reports on the history of human-environmental interaction. Meryl Landau and Charles Howlett examine environmental problems in the past. Articles on ozone depletion, global warming, desertification, nuclear power, biofuels, disease, and toxic waste provide background information and lesson materials on contemporary environmental issues. Patricia Gencarelli, Christopher Harris, Kevin Sheehan, Suzy Mellen, and Judith Y. Singer explore teaching ideas for younger students. Lysa Beatus, Marissa DeLillo, Kellyann Dooley, Rena Drezner, Anthony Geremina, Kristin Joseph, Meryl Landau, Frank Maniscalco, Suzie Mellen, Atia Pasha, Scott Raulsome, and Krystle Rogala review books, videos, and websites that focus on environmental issues. The theme section also includes an article on hunger today adapted from the New York State Great Irish Famine curriculum.

Globalization and the Environment

by Alan Singer

Act I scene I in Shakespeare's *Macbeth* opens with thunder and lightening. There are three shadowy figures, witches, on stage. The first witch asks her companions: "When shall we three meet again, in thunder, lightning, or in rain? A second witch declares they will meet "When the hurlyburly's done, when the battle's lost and won." The third witch adds, "That will be ere the set of sun." Before they leave the stage, the three witches announce in chorus: "Fair is foul, and foul is fair: Hover through the fog and filthy air."

The witches provide us with Shakespeare's insight into the troubled world of *Macbeth*. The conditions they describe still hold true today. How do we effectively respond to the destruction of human environments and potential global catastrophe in a world where fair is confused with foul, where we are manipulated to believe that foul is somehow fair, and more and more, pollution hovers through the fog and filthy air that we breathe and water that we drink. Environmental scientists warn us that we cannot afford to wait until the "hurlyburly's" done, but much of the world, including many of its most powerful figures, are not listening.

An Inconvenient Truth

It is not surprising that people are confused about what is happening to the environment. According to Al Gore in the Academy Award winning documentary, *An Inconvenient Truth* (2006), 100 percent of articles in scientific journals agree that climate change is real, but half the news stories, and former President of the United States George W. Bush, refer to it as an unproven theory. Increasing concentrations of greenhouse gases in the atmosphere, rising average temperatures, and the melting of glaciers and ice caps, illustrated by Al Gore in the documentary, are all facts, not opinions or theories.

While *An Inconvenient Truth* is an important movie and a needed wake-up call on global warming, I have three significant problems with it. First, I do not understand why former Vice-President Gore felt the need to present all the data himself. Why didn't we hear from the scientists to whom he keeps referring?

The second problem has been commented on by many of Al Gore's detractors. He exaggerates for effect. For example, he argues that if the Antarctic and

Greenland ice caps melt, sea level could rise twenty feet in this century. Animated maps and computer simulations show that such a sea-level change would flood most of southern Florida, much of Manhattan, Shanghai, Bangladesh, and other densely populated regions with hundreds of million of people. However, the consensus among climate scientists at the United Nations' Intergovernmental Panel on Climate Change is that sea level is likely to rise less than three feet in the 21st century, not an insignificant figure, but much less than Gore's extreme projection.

The third problem is the most significant one for me. Gore paints a dire picture of climate change. His PowerPoint graphs on pollution and global warming show acceleration in recent years at such a dramatic rate that the lines are leaping off of the charts. If Gore's analysis is right, then the solutions he proposes are much to moderate and do not address the magnitude of the problems facing humanity.

The documentary is approximately one hour-and-a-half long, but only the last five minutes are reserved for proposals about what can be done to reverse global warming. In these five minutes, instead of demanding radical and systemic change, Gore proposes much narrower reforms that center on personal life-style issues. He wants viewers to reduce their personal carbon emissions by carpooling, checking tire pressure, buying low-wattage light bulbs, adjusting thermostats two degrees up in summer and two down in winter; using less hot water; and planting carbon-absorbing trees. These are all good ideas, but I doubt they will have much impact on the amount of carbon being spewed into the atmosphere or global warming. They certainly do not address the past two hundred years of environmental degradation and its accumulated impact. The Kyoto protocol, the major international environmental accord reached during the Clinton-Gore administration of the 1990s, would only reduce carbon dioxide emissions back to 1990 levels at best. A weak and limited treaty, it is set to expire in 2012. The United States never signed it because President Bush felt it would hinder the national economy. China and India, two of the world's largest polluters, are exempt from its rules.

If we are serious about reversing global warming, we need to ask upsetting questions, questions that Al Gore has refused to address:

- Is free market capitalism the solution to environmental problems, or the problem itself? Can the short-term corporate profit motive solve environmental problems, or will it inevitably contribute to the long-term destruction of the environment?
- Does globalization leave us any safe harbor or are we subject to what is being done in other parts of the world?
- Is environmental decay an inevitable process?
- Do human civilizations have alternatives?
- What does it mean to think globally and act locally?

According to Thomas Friedman, *New York Times* columnist and author of *The World is Flat: A Brief History of the Twenty-first Century* (2005) and *The Lexus and the Olive Tree* (1999), “the driving idea behind globalization is free-market capitalism – the more you let market forces rule and the more you open your economy to free trade and competition, the more efficient and flourishing your economy will be. Globalization means the spread of free-market capitalism to virtually every country in the world. Globalization also has its own set of economic rules – rules that revolve around opening, deregulating and privatizing your economy” (Friedman, 1999:8).

Friedman’s underlying proposal is that if the countries of the world deregulate markets, trade, and the ability of profiting seeking capitalists to search for and maximize profits, standards of living will rise and economic and political problems will be resolved.

Whether you agree or disagree with Friedman’s argument that unregulated capitalism will necessarily promote development, we know from both the past and present that it always comes with costs. There are always huge numbers of people, entire societies, displaced by economic change whose lives are irreparably damaged. You may not be the person to pay for change, but someone always does. Stock brokers, bankers, and technicians may have made fortunes as the United States became a service and information economy, but what happened to all the auto and steel workers and coal miners who lost their

jobs, and all the young people who never got jobs, because the United States de-industrialized.

Unregulated capitalism in the United States and around the world may continue to generate record profit, but what happens to the environment as factories are moved from country to country so they can use the air, land, and water as a dumping ground for toxic materials and avoid the costs of clean-up. When companies try to reduce the cost of production, the environment is one of their first targets. Even business leaders who would like to think of themselves as environmentally conscious know they face bankruptcy if they do not follow the same exploitive practices as their competitors. This system is difficult to change because of the enormous wealth and power of capitalist corporations and because of the prevalent ideology, which is that coordinated government planning and international cooperation to protect the environment will only make the problems worse. Some critics have argued that for the environment, capitalism is the equivalent of cancer – it eats away at the body that is sustaining it until the organism and the cancer die together.

Capitalism and the Climate Crisis

I believe the capitalist economic system that predominates in the world today is unable to resolve the global climate crisis because of its commitment to short-term corporate profitability. Because no one owns the atmosphere and the oceans, industry is able to use them as free dumpsites for waste. To remain competitive, even centrally planned state-dominated economies, such as the one in China, treat the atmosphere this way.

The Earth will survive human folly and recover, but it is not clear that human society will. It is past time, maybe even too late, but we need to seriously address the question whether capitalism can resolve the global climate crisis?

Free trade is never free, especially when it promotes pollution and environmental destruction. It is time to call it what it really is – foul trade – and to organize, collectively, and refuse to purchase foul trade goods. An international boycott on goods made in China, and Wal-Mart, its leading distributor in the United States, would be a good start. Hopefully, in a capitalist market place, our position as consumers will give us some leverage. We need to think globally, act locally, and act globally as well.

Free Market Environmentalism (FME) Explained

These excerpts from a 1997 interview with Dr. Terry Anderson, Senior Fellow, Hoover Institution on War, Revolution and Peace, at Stanford University, provide an alternative view of the relationship between capitalism and the environmental crisis. Source: <http://www.hoover.org/publications/digest/3531676.html>

For many conservatives, environmentalism has always been an Achilles' heel; it is commonly believed that to be a conservative means that you must be in favor of destroying the environment to raise incomes. But in reality, the tradition of conservationism is actually a conservative one. We need to get the incentives right by using property rights and markets to achieve what we want. The same reforms that we have recently used in education and welfare reform can be applied to the environment by reducing government involvement and improving incentive structures . . .

The first premise of FME is that "wealthier is healthier," meaning that markets generate the wealth that gives us the wherewithal to solve environmental problems. Although many people mistakenly think that markets can only generate consumerism and other gunk, in reality it is markets that produce wealth and thus help the environment. The second major premise of FME is that "incentives matter." Positive incentives can turn the environment from a liability into an asset for a resource owner. If we own the water and land, we have the incentive to manage and conserve them properly . . . The environmental community in general has embraced market approaches; from as far away as Africa, almost everybody is at least considering market solutions.

The economics profession has not been very receptive to FME, probably because a lot of people have a stake in the old natural resource paradigm and because old ideas don't die easily. We aren't, however, throwing out the old paradigm as much as we are taking the existing one and applying it in new, innovative ways. Thus a favorable perception of FME is growing. Markets may not be able to solve everything, but that doesn't mean we should prevent markets from solving what they can.

What most people mean by market failure is a situation where, for one reason or another, people either aren't bearing the full costs of their actions or aren't receiving the full benefits of them. This is the accepted definition. But the question should then be, How bad is this? Probably the most incontrovertible example of market failure is air pollution because market solutions depend on definitions of property rights, which in regard to air pollution are tough to define. Matters can be improved, however, even in this difficult case. For example, we can at the very least decide to use tradable permits, which are certainly better than the arbitrary regulation that now takes place. The other way of helping in these tough cases is to better understand how the common law might have helped solve such problems. Me suing you to collect for damages you have inflicted on my airspace with your power plant might take care of many of the problems we have with things like air pollution without government regulation . . .

Many environmentalists suffer from the "nirvana fallacy," meaning that they assume that, whenever there's a problem, the government can solve it. They fail to see that many times, when the government attempts to solve something, we get perverse solutions . . . [T]he Endangered Species Act . . . creates perverse incentives by penalizing people who oversee resources. First, I'd encourage private environmental groups to contract with landowners, and, second, I'd use financial resources (from user fees on public land, for example) to compensate landowners for preservation procedures. [The Endangered Species Act] is up for renewal, which gives FME advocates a chance to have an input . . .

Global warming is a threat to our economic well-being but not to our physical well-being. What I mean by that is that as a scientifically proven problem it is basically a myth. It is not a threat to the human species. I think that the theories alone aren't very sound and that the data to back them up are worse. The reason I say it's a threat to our economic well-being is because politically it is perceived as such a threat that drastic measures are being taken that will adversely affect our economy. Take the Kyoto summit, for example, where insane treaties will raise U.S. costs of production and make the United States much less productive while exempting many other nations.

Teachers Respond: Can Capitalism Resolve the Global Climate Crisis?

According to economist Matthew Clement ("The Failure of Climate Change Economics," Monthly Review, <http://mrzine.monthly.org/clement150108.html>) the capitalist economic system that predominates in the world today is unable to resolve the global climate crisis because of its commitment to short-term corporate profitability. Because no one owns the atmosphere, industry is able to use it as a free dumpsite for waste. This bolsters their profits and they do not have to pay for the cost of environmental degradation. To remain competitive, even centrally planned state-dominated economies, such as the one in China, treat the atmosphere this way. This system is difficult to change because of the enormous wealth and power of capitalist corporations and because of the prevalent ideology, which has it that coordinated government planning and international cooperation to protect the environment will only make the problems worse.

Pro-business economists and American government policy makers from the time of the Reagan administration in the 1980s have hindered efforts to protect the environment because of their commitment to the economic logic known as "cost-benefit analysis". Using this approach, President Bush renounced the Kyoto environmental accords designed to reduce greenhouse gases in the atmosphere and combat global warming because of the ways in which it would have impacted the American economy. Bush, and economists supporting his administration, argued that in order to work, any proposal to combat environmental problems must be justified by immediate economic benefits. So far no proposals seem to meet that standard. It leaves us with the question: Can capitalism resolve the global climate crisis? – Alan Singer

Arthur Green, Consultant for Social Studies, New York City Department of Education: I see no contradiction between capitalism and solving a problem such as global warming. As the price of fuel rises, it becomes profitable to invest in and market alternatives. Notice the advent of ethanol, the rebirth of interest in atomic energy, wind, and solar power. Notice the increase in people taking public transportation and the increasing reliance on recycling. I must assume that our era of fossil fuels will give way to other types of power all in the name of progress. Government has a role to play in all this. Bounties, subsidies, grants, tax incentives, educational programs, and the like brought us, in part, to where we are today. These same incentives will encourage companies to do more R & D and market alternative sources of power and other products that will be less dangerous to the environment. They will also allow for the long term planning that is needed for the development and marketing of new products. Beyond that, a certain amount of government regulation and supervision of the private sector in the interests of the public good is always required.

Gregory D. Zinsley, President NYS4A, Social Studies Department Chair, Poughkeepsie (NY) High School: I would rather rephrase the question to read, "Can economic reasoning resolve the global economic crisis?" Doctrinaire approaches to problem

solving are always problematic and we must not fall for the fallacy that the United States has a capitalist economy. There are economic and socio-economic goals and while the former may be easily gleaned by looking at numbers, it takes vision and leadership to see that quality of life is ultimately economically beneficial.

Regardless of philosophical construct, all efficient economic decision-making is based on the understanding of opportunity costs. Mr. Clement properly cites the shortsightedness of corporate interests and their policy-making supporters for using cost effectiveness and the standard for decision-making. His citation of global warming is very appropriate and highlights how everyone must reassess the conventional wisdom about economic growth.

As awareness of global warming has grown, so has the realization that pollution costs are costs of doing business. Government then regulates, and the cost benefit analyses are more accurate. Businesses make profits and environmental policy becomes effective. An accurate bottom line is not dogmatic, just good economics.

It would be naïve to think that greed is not a force behind the cost-benefit determination. Recent business history has shown, however, that business leaders who do not examine the socio-economic impact of their decisions have seriously harmed the drive for profits. In global society all people will be forced to absorb

those costs that make our world healthy and safe. Prices for goods and services might rise and profit margins dwindle.

Mr. Clement states, “an environmental catastrophe enormous in scope and damage *could* make . . . policy economically rational.” It will not take a catastrophe. It will take perspective and courage on the part of business leaders and their training institutions, the scientific community and its study of the environment and elected officials who refuse to respond to special interests but define the common good and ensure that all economic policy takes *all* costs into account.

“The issue of climate change is one that we ignore at our own peril. There may still be disputes about exactly how much we’re contributing to the warming of the earth’s atmosphere and how much is naturally occurring, but what we can be scientifically certain of is that our continued use of fossil fuels is pushing us to a point of no return. And unless we free ourselves from a dependence on these fossil fuels and chart a new course on energy in this country, we are condemning future generations to global catastrophe.”

- Senator Barack Obama, April 3, 2006

Source: <http://thinkprogress.org/obama-oil-speech/>

Jessica Dennsteadt, Red Bank (NJ) Regional High School: Capitalism combined with political will can resolve the environmental crisis at hand. One example in which free markets and government can work together to resolve this problem is by supporting systems like the cap-and-trade system for carbon emissions. Extending the requirements in the cap-and-trade system would reduce carbon dioxide and other greenhouse gas emissions through the buying and selling of emission permits. Governments would auction off permits to companies for every ton of carbon dioxide they release into the environment. Companies that emit less could sell their extra permits to companies that exceed their permit limits. This would encourage companies to find more efficient technologies and in time allow companies to rely less on cost of permits and more on profits from the efficiencies of improved practices. In addition, government funds gained from the permits can subsidize tax breaks for energy efficient practices or R&D development in green technologies. . These ideas are the cornerstone of the United State 1990 Clean Air

Act and the Kyoto Protocol. The U.S. failed to sign onto Kyoto because developing nations have not been included. Production and business would move abroad and carbon emissions would simply move from area of the globe to another.

Political leadership for environmental protection will emerge. We see examples of this already in agreements between the U.S. and Australia, China, South Korea, and India to decrease carbon emissions. While each country determines its own goals and is not held accountable, issues are beginning to be addressed. We now see more private sector green initiatives, largely unrelated to government regulation. As GE’s CEO Jeffrey Immelt famously stated, “Green is Green.” Green technologies can be economically profitable. Toyota’s Hybrid cars and startup companies such as Telsa Motors, a Silicon Valley company that has released an electric car, are examples. GM plans to release an electric car in 2010. Businesses can and will solve the environmental crisis, but the speed at which it happens is dependent on our politicians’ ability to embrace energy conservation policies.

Elaine Lawrence, SUNY Oneonta, Oneonta, NY:

Given the cost-benefit analytical focus entrenched in the American capitalist economy, the citizenry as a whole needs to be convinced of the ultimate benefit (usually a monetary benefit to individuals) of alternative economical models. Currently alternative energy sources are being developed and utilized on a relatively small scale in our capitalist economy. Biofuels, wind, and solar power alternatives have made slight inroads into U.S. lifestyles but mainly through the efforts of individuals. In order to reduce a nation’s carbon footprint to any noticeable level the nation/state needs to step in to aid the impetus begun by these individuals. Presently the cost of converting a home, business, or transport to a *greener* energy source is prohibitive to the average citizen.

An increased promotion of state-sponsored efforts at research and development to produce alternative energy sources that are practical, *green*, and economical can open doors for private citizens, institutions, and organizations who have been attempting to discover energy substitutions. This policy can be promoted via all nations of wealth – not just capitalist nations. Once a nation has decided to embark on a *green* policy it needs to look at the variety of options already in place around the globe. There are

nations that have adopted alternative lifestyles and as a result have reduced their carbon footprint. We witnessed similar lifestyle changes, with some modicum of success, during the Carter administration when the U.S. economy was impacted by rising oil prices. The cry went out for, and citizens began using, more fuel-efficient vehicles and mass transit. Government organizations introduced the creation of car pool lanes and providing incentives for updating buildings to reduce heating/cooling leakage. Once this economic crisis passed the country had a tendency to return to its old ways. What is required is a lifestyle change that will last longer in order to realize a true change in the global climate.

Once the institutions and organizations have developed alternative energy sources (via the increased state sponsored research and development) it will be necessary to educate the public about their use and impact. When technology makes these more economically affordable for the masses, the cost – benefit scale may balance in favor of the environment. When these new methods become the least expensive way(s) to create and use energy, the public will utilize energy consumption methods that are much less harmful to the environment – e.g., wind, solar, hydro, and biofuels.

The public also needs to be made aware of loopholes in climate change agreements that allow those who can afford to an option to meeting emission reduction levels. The citizenry needs to use its voice to close loopholes and make everyone ecologically responsible. One option for groups (businesses and governments alike) is the ability to purchase credits/permits to offset their emissions. NCEP (National Commission on Energy Policy) proposed a permit purchasing option. Businesses and individuals who can reduce their fuel use and emissions most inexpensively will do so. Those who cannot will purchase more permits and support those who can. The program flexibly encourages the least-expensive efforts to reduce emissions without constraining any individual or business. According to *The Wall Street Journal*, revenue from the auction of a portion of these permits could be used to reduce the corporate income tax, blunting adverse economic consequences.

Utilizing elements already in place within economies and a united global citizenry can indeed aid the global crisis. The cost-benefit focus needs to deviate from its typical monetary benefit focus for the

individual to a benefit to the public. The long-term cost to clean up the environment, change existing structures, and provide health care needs to be considered as part of this analysis.

Carron Mastan, Ballston Spa (NY) Middle School:

If you give people the opportunity and the resources to come up with ideas, I think capitalism and the profit motive can find solutions to today's environmental problems. Problem solving through innovation by private enterprise is one of the principles the United States economy was founded on. Historically it has been very successful at generating technological and economic change. Right now the United States is very reliant on foreign oil. I believe American companies, if given the financial resources to properly support research and development, will come up with alternate sources of energy that would be cost efficient for everyone. I feel that the entrepreneurial spirit of America would be more effective at finding solutions than big government. I do not pretend that capitalist enterprises have always been beneficial to the environment or that they should go unregulated. I live in an area of New York where General Electric was notorious for dumping toxic waste into the river, companies polluted landfills, and taxpayers are paying to clean up the damage. Capitalism and industrialization are not the only causes of pollution. I often examine environmental issues in the global history curriculum. For example, the Ganges River in India is a holy river to Hindus, but their religious ceremonies and bathing in it have contributed to pollution.

Michael Collazo Grover Cleveland High School, Queens, NY:

Traditional capitalism is one of the causes of global warming. The bottom line for companies is profit. That does not mean capitalism cannot be a force to solve global warming. Our society must find ways to tweak the system so businesses profit by being environmentally conscious. It is hard to blame countries such as China for polluting because they are using the only resources they have available to improve conditions for their populations. I am not sure what the solution to this problem is. We probably need to have more government involvement in the economy, to educate the public, regulate companies, and promote more effective planning.

Delores Coleman, South Park High School, Buffalo, NY: Capitalism bears a lot of responsibility for polluting planet Earth. Competition between corporations is so fierce that they end up polluting the environment to protect their profits. New technology is always being created, but its first purpose is to maximize profit, not to protect the environment. Every company wants to be first with the new product or innovation, but the needs of people are always placed second. However, I also believe capitalism can be part of the solution to environmental problems if businesses and countries start to focus on what the world will be like in fifty to one hundred years when our great-grand children will be living here. Another problem I am seriously concerned with is global population increase and its impact on the environment. Population increase is a major contributor to the overuse of resources. I lead workshops for teachers and students for an organization called Population Connection. At our website (<http://www.populationconnection.org/>), we provide lesson plans, activities, and fact sheets about problems related to population increase that can be used in the classroom on all grade levels. In my workshops, I focus on hands-on classroom activities that can improve the environment. In one activity, I have a bowl of clean, drinkable, water and film canisters containing different factory, garden, and household pollutants. Students pour the pollutants into the water and observe how it is transformed. This helps them understand what pollution is doing to our environment.

Wesley Ciampo Morris (NY) Central School: Capitalism is both a root cause of global warming and other environmental problems and a fundamental part of the solution. There is no quick fix for cleaning up the environment, but it certainly will not happen if we demonize business. Forcing through new environmental regulations in this country is not the answer. The economy is too delicate, and other countries, such as India and China, may not follow our example. Even American companies might just outsource industrial work overseas to places where there are fewer restrictions on production. Society must mobilize its producers, the people who make our cars, companies that provide energy, and other industries, if there is going to be fundamental change. This will not happen overnight. Current environmental clean up programs are too low-level and localized. Global

warming is a global problem and requires a concerted global effort. It is going to be a long process and capitalists are going to have to be involved giving leadership.

Marc Rinow, Lancaster (NY) Middle School: I worry that the money of large corporations that allows them to hire lobbyists and influence government decision-making is interfering with efforts to combat global warming and other environmental problems. Americans want to change the way we do things; they are especially upset with the high price of gasoline and our economy's reliance on fossil fuels. There are not enough market options available so that people can make other, more environmentally friendly, choices. In the past, the oil companies blocked research into the development of alternative fuels because they wanted to protect their own profits. However, as people recognize the crisis more, money seems to be going into research and alternative technologies may finally start catching up to human needs. This is not first time in United States history that major industries pursued their own agendas at the expense of the public good. Remember the era of the robber barons and the power of monopoly at the end of the nineteenth century. However, popular movements and government regulation finally helped shift the way business worked. This can happen again and capitalism can become a force for combating global warming.

Laurie Locke, Hofstra University, Hempstead, NY: "I speak for the trees." These are the words spoken by the Lorax in Dr. Seuss's classic tale about the impact of industrial capitalism on the environment. The Lorax speaks for the trees because capitalism, personified by the Onceler, has taken over a once picturesque land and destroyed it by building a factory, pillaging its natural resources, and producing something that no one really needs. This is the story of our modern industrialized world. The history of capitalism is a history of the exploitation of people, of resources, and of the environment. Capitalism is defined by Webster's dictionary as "an economic system characterized by private or corporate ownership of capital goods and by prices, production, and the distribution of goods that are determined mainly by competition in a free market". Nowhere in that sanitized definition is there any mention of what is best for the community or the earth. It is simply a cold, calculated "by any means

necessary” cycle of production and profit. It is based on the premise that the Onceler called “biggering.” Products must be created based solely on demand, not need. Demand, of course, is bred and fed by corporations themselves. These products must be manufactured cheaply and quickly regardless of the destruction of natural resources and the surrounding environment that inevitably takes place. We should never mind the fact that these actions always have consequences. In the Lorax the consequences of the Onceler’s actions are “smogulous smoke, gluppity-glupp, and schloppity-schlopp” which leads to the evacuation of Swomee-Swans, Humming-Fish, and Brown Bar-ba-loots from their once idyllic life and

land for destinations unknown. In reality the consequences of corporate greed are quite similar. The Lorax does, however, end on a note of hope. The Onceler realizes the error of his ways and leaves us with the message the Lorax himself left him. That message is “Unless.” Unless we end the cycle of greed, unless we shift our mentality from one of consumption to one of conservation, unless we create an environmentally and economically sound policy to replace that of capitalism, the only difference between our world and the world of the Lorax will be that people and animals will no longer have the luxury of evacuation because there will be nowhere left for them to flee.

Response to “Are We Teaching Religious Myth or the History of Religion?”

by Joseph Gironda, Holy Family Academy, Bayonne, NJ

As a social studies teacher whose courses are philosophy, history, sociology, and psychology, I was very interested in the article, “Are We Teaching Religious Myth or the History of Religion?” in the Summer-Fall 2008 edition of *Social Science Docket*. The article was well researched and written in a scholarly manner, but I have disagreements with some of the statements.

In the very first sentence, the author states: “My children describe me as an ‘evangelical atheist’ because I actively recruit converts to my disbelief.” His disbelief is demonstrated in the third paragraph, where the author presents his negative views on the existence of Jesus and the story of Exodus as facts rather than as historical controversies. I feel the entire paragraph was tangential to the author’s arguments and should have been deleted from the article.

I support the author’s assertion that teachers must explore the ways that religions were active in their societies and shaped, or helped to shape, them. However, he makes the same mistakes he accuses others of making. On pp. 9-10, he cautions teachers to be leery about what is included in textbooks because they often present the opinions of individual historians as if they were generally accepted facts. But doesn’t he do this himself when he writes “In Sumer, the earliest government was supposedly controlled by temple priests because of the superstitions of the farmers who believed the priests were go-betweens with the gods.” While I admit that I know of no one today still worshipping the gods of the ancient Sumerians, many believe that priests are genuinely go-betweens with a Supreme Being. It really was not necessary to include the word “superstitions” in this sentence. Describing a religious belief as a superstition is an opinion rather than an historical analysis. It did not further the arguments made in the article.

The article brought up interesting questions that can be addressed in a social studies classroom, such as, “How are religious conflicts similar to or different from racial, ethnic, and cultural conflicts? Questions such as this one are excellent for discussions or essays, which is the critical thinking that I believe your article was actually meant to address.

It was a fine article, but I believe the author’s religious leanings did find their way in.

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The Thingamabob Game and Impact of Capitalism on the Environment

by Bill Bigelow

Bill Bigelow is curriculum editor of the magazine *Rethinking Schools* and of a number of books. The Thingamabob Game is reprinted from *Rethinking Globalization, Teaching for Justice in an Unjust World* (Milwaukee, WI: Rethinking School). Rethinking Schools publications can be ordered on-line at <http://www.rethinkingschools.org>. Simulations are useful in illuminating aspects of reality, but they can obscure or miss other important aspects. The Thingamabob game effectively highlights how the capitalist market has no built-in alarm system to protect the earth. Social critic David Korten writes, "There are no price signals indicating that the poor are going hungry because they have been forced off their lands; nor is there any price signal to tell polluters that too much CO2 is being released into the air, or that toxins should not be dumped into soils or waters." But the simulation may imply that we all suffer equally as the earth deteriorates. Nothing in the activity suggests that environmental impacts reverberate unevenly through the global landscape, affecting the Third World, the poor, and people of color differently than the upper classes. And the game's cataclysmic end may distort the way things are likely to play out in real life, as pockets of the world become unlivable but the privileged exist relatively comfortably in gated communities, on bottled water and perhaps even "bottled" air.

In the Thingamabob Game, small groups of students represent competing manufacturers of "thingamabobs" – consumer goods that, as in the real world, require natural resources to produce. As in the real world, at some point in the future, the cycles of production and consumption will exhaust the earth's resources and capacity to contain the pollution generated by these cycles including greenhouse gas pollution. Endless growth is a physical impossibility. Armed with knowledge of the earth's limits, the competing groups of students/manufacturers see if they can be environmentally responsible, given the rewards offered by – and punishments exacted from – a profit-based economy. The game can be fun, frenetic, and frustrating. From this activity students can gain more clarity about strategies for saving the planet.

Before beginning the game, I show the video "Earth and The American Dream," although this is not necessary for the activity to succeed. Then I distribute copies of "The Thingamabob Game Role Sheet" to students. For simplicity's sake, each "company" does not have to worry about developing markets for its goods. The game assumes that whatever is produced can be sold. Thus with each round, every company increases its capital and can produce even more thingamabobs, if the student "managers" of that company so choose. Each company starts out with \$1,000. Thingamabobs sell for \$2 a piece and cost \$1 to produce. So a company makes a dollar for every thingamabob produced. Companies can't spend any more money than they have. For the first round, their maximum production is 1,000 thingamabobs that

would leave them with a total of \$2,000 after the round, if they decided to produce as much as possible.

Thingamabob Game Role and Reward Sheets are available in *Rethinking Globalization*.

It can be ordered on-line at <http://www.rethinkingschools.org>.

Note that the role sheet promises candy for all the winners. It's important that you have desirable candy awards ready, and that you show these to students to motivate them to try to win. However, every class that I have done this with has produced so many thingamabobs that it triggered environmental ruin, so the reward you select will likely be moot. The concluding paragraph of the instructions warns students that at the end of the five rounds if the total number of thingamabobs produced (i.e., by all seven groups in all five rounds) exceeds the trigger figure, every company loses the game. Students don't know the precise trigger point of environmental destruction. I set the figure at 35,000 thingamabobs, and have that written on the board but covered up. Students know that the figure is somewhere between 20,000 and 40,000 thingamabobs. Emphasize the tension in the game – as in real life: They will be rewarded based on how much profit they produce for their company; but the more thingamabobs they produced, the closer they bring the planet to environmental devastation.

Divide the class into seven groups. It's fine if there are only a couple of students in the group, or five or six. Tell each group to come up with a thingamabob company name. Distribute five Thingamabob Production Round Slips to each group (Students should list the name of the company, available capital, and how many thingamabobs they will produce). Ask them to make their first production decisions. They should discuss these among themselves, complete the information on the slip, and hand them to you without revealing their numbers to their competitors.

Write all the company names on the board or overhead and post the first round production figures. Be sure to add up the number of thingamabobs produced in each round and keep a running total of all the thingamabobs produced in the game. Point out the "loser" companies whose profits don't match those of their competitors. Tell these companies that their stockholders are getting restless because their competitors are so much more successful, even though they began with the same amount of capital. If one company decides that it wants to carry the banner for the earth and produce no or few thingamabobs, I may declare that company bankrupt and distribute those students to other groups so that they get the message that failing to compete has consequences.

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Continue round by round, indicating the most and least profitable companies. Emphasize how the total thingamabob production count is getting dangerously high (Remember, you know that the trigger figure of environmental no-return is 35,000 thingamabobs; they know only that it is between 20,000 and 40,000 figure). If by some miracle at the end of round five, thingamabob production of all companies has not exceeded the trigger number, award the prizes to the groups as indicated on their role sheet.

Afterwards, ask students to write about the activity. Why did you destroy the earth? You saw it coming, but you did it anyway. Students can comment on the observation by ex-financier James Goldsmith that "winning" in a game like this is like "winning at poker on the Titanic." You might also ask them at this point to reflect on what, if anything, they could have done that would have led to a more positive outcome.

Begin the discussion by getting students to talk about what they wrote. Other discussion questions include: Describe what went on in your group. What pressures did you feel? What prevented you from being more ecologically oriented? In what ways does the game resemble what happens in real life? What was unrealistic about the game? Is the game "rigged"? Could the rules be changed in ways that would not lead to environmental destruction? What different behaviors could be rewarded? Ask students about the implications for dealing with climate change?

In real life everything that is produced is not necessarily purchased. This is one of the central contradictions of market economies: They tend toward overproduction and boom-and-bust cycles. And the production of every "thingamabob" will not be equally unfriendly to the environment. Indeed, some production – for example, solar panels-may soften human's effect on nature. These and other limitations can and should be discussed with students. Still, the game's essential caution – that a profit-oriented economic system is incompatible with environmental responsibility – is one that is hard to deny.

RULES OF THE GAME

- Each company will begin the game with \$1,000 in capital. Each thingamabob costs \$1 to produce. You will make \$2 off of every thingamabob you produce and sell. Of course, with every thingamabob produced, the earth comes one step closer to its death.
- There will be five "production" rounds. At the end of the fifth round, you will be rewarded based not on how nice you are to each other, or to the earth, but on how much profit you've made for the company.
- If the total production for all groups goes over the trigger number — somewhere between 20,000 and 40,000 thingamabobs — the earth's environment is damaged beyond repair, and no one will receive any candy.

Environmental Issues: A Website Directory

by Lysa Beatus

The Internet is a useful resource for collecting both background and current scientific information on a variety of environmental issues. News agencies, non-profit organizations, academic institutions, and governmental and international agencies have either created websites, or dedicated portions of their websites, to addressing the issues related to the worldwide dangers to the environment. Many of the websites are largely informative. Others promote particular agendas. They encourage public activism, try to influence business and governmental policy makers, or challenge scientific reports. This list is a sample of websites that address the environmental issues facing the world today. Some are suitable for students performing at lower academic levels. Others are geared for more advanced readers. Many have teaching resources useful in daily lesson planning. They were last accessed in May 2008.

Interactive Sites

Global Warming Materials for Educators.

http://www.ucsusa.org/global_warming/science/global-warming-materials-for-educators.html. This educational resource is part of the main website of the Union of Concerned Scientists, a non-profit science-based organization that is an alliance of citizens and scientists. The organization's purpose is to provide independent analysis and practical solutions on a broad range of environmental and global security issues including: global warming, developing clean energy policies, vehicle pollution, the dangers of invasive species, worldwide global security, genetically engineered food crops, and political interference with scientific integrity. It is an excellent source for teachers and students in both science and social science classes. Included in the materials for educators are interactive maps and a curriculum guide. Coverage may be a little technical for most students, however there is also more basic information that can be used with students. There is a section explaining how hybrid cars work by Bill Nye, the Science Guy.

Climate Connections.

<http://www.npr.org/templates/story/story.php?storyId=9657621>. NPR and National Geographic created "Climate Connections." It includes articles, podcasts, videos, and an interactive map detailing a yearlong trip around the globe to investigate how "people change climate and how climate changes people" in different regions of the world. Materials are easy to follow and the interactive map is a very useful hands-on learning tool. Of particular interest to younger students is an animated cartoon video series explaining the role of carbon in global warming.

The Mannahatta Project. http://www.wcs.org/sw-high_tech_tools/landscapeecology/mannahatta. This site is the culmination of a ten-year effort, sponsored by the World Conservation Society, to recreate the ecological landscape of Manhattan Island (called Mannahatta by the Leni Lenape Indians who settled there) as it existed at the time of Henry Hudson's first voyage to the area in 1609. When completed, the website will include an interactive map comparing Manhattan in 1609 with the way it looks today.

Governmental and International Organizations

Climate Change. <http://www.epa.gov/climatechange/>. The goal of the Environmental Protection Agency's "Climate Change" site is to "offer comprehensive information on the issue of climate change in a way that is accessible and meaningful to all parts of society - communities, individuals, businesses, states and localities, and governments." The site is divided into five sections which provide: scientific explanations; a summary of U.S. policy; information on U.S. and global greenhouse gas emissions; an overview of the effect of climate change on health and the environment and ways to reduce greenhouse gas emissions.

EPA Climate Change Kids.

<http://www.epa.gov/climatechange/kids/index.html>. This site was developed by the EPA as part of its Climate Change website. It is easy to use and the reading level is appropriate for most students. Younger students will enjoy the animations. The site also contains an extensive set of links which vary from coloring books for younger children to science project ideas and a rebroadcast of Nova programs.

OzonAction Education Pack.

<http://www.unep.fr/ozonaction/information/educationpack.htm>. The United Nations Environmental Programme Division of Technology, Industry & Economics developed an Education Pack for primary school teachers to teach students about the depletion of the ozone layer. It includes a downloadable program about the sun and the dangers associated with the depletion of the ozone layer, as well as hands-on activities and color charts.

Energy Education.

<http://www1.eere.energy.gov/education>. This U.S. Department of Energy produced site contains more than 350 lesson plans divided by topic and grade level and correlated to the National Science Standards. Many include easy to read background information and handouts. The student section has links to energy-related science project ideas, resources for science project reports, college programs, scholarships, and internships.

New York State Energy Research and Development Authority. <http://www.getenergysmart.org>. The energy education section of the New York State Energy Research and Development Authority includes a newsletter and fact sheets on energy basics, hydrogen education, global warming, and emissions reductions. They are excellent resource for teachers.

Educational Websites

Atmospheric Science Explorers.

<http://www.ucar.edu/learn/index.htm>. This site contains a learning module developed for use by middle school science teachers to incorporate “atmospheric science concepts” into science classes. It contains excellent background information and visuals that can be utilized by social studies teachers to help students understand the processes associated with global climate change.

Global Science Systems.

<http://www.lawrencehallofscience.org/GSS/>. This site is an “integrated interdisciplinary course” designed at the University of California at Berkeley by scientists, teachers and curriculum developers. Material can be purchased. Teachers are permitted to download one copy for free for use in preparing curriculum.

Global Warming.

<http://www.timeforkids.com/TFK/specials/articles/0,6709,1113542,00.html>. Time for Kids Online is the companion website to the weekly magazine, *Time for Kids*. This special report provides an easy to follow basic primer on global warming.

Population Education.

<http://www.populationeducation.org>. Population Education is an education program for students in grades pre-k to 12. It evaluates how population trends and world population growth affect the environment. Available on the site is a free downloadable copy of *Earth Matters*, a textbook appropriate for grades 9-12.

Global Footprint Network.

<http://footprintnetwork.org>. This site allows students to calculate the impact of their personal lifestyles on the environment.

News Agencies

The Global Warming Debate.

http://www.pbs.org/newshour/indepth_coverage/science/globalwarming/. The online site of the PBS show “News Hour with Jim Lehrer” contains in-depth coverage of the global warming debate. Of particular interest is a streaming video explaining the use of carbon offsets to reduce carbon footprints and the unregulated industry of trading these carbon offsets. It also provides a global view of greenhouse gas emissions and global warming and includes the provisions of the Kyoto Treaty.

CNN Planet in Peril.

<http://www.cnn.com/SPECIALS/2008/planet.in.peril>. A companion site to the four-hour CNN documentary “Planet in Peril.” It is user friendly with articles, reports, and podcasts from a global viewpoint, as well as activities and videos for the classroom.

BBC Climate Change. <http://www.bbc.co.uk/climate>. The site provides an in-depth examination of the European Union’s position on climate change as well as actions to protect the environment taken by European nations. Of particular interest is its criticism of U.S. policies under the Bush Administration. There is a basic illustrated primer on greenhouse gases useful for all students.

Environmental Organizations

World Wildlife Fund.

<http://www.panda.org/index.cfm>. The WWF is one of the world's largest environmental organizations. It focuses its efforts on five major areas: climate change, forest, freshwater, and marine conservation, endangered species, and sustainability. There is a link to the Biodiversity Economics site co-sponsored by WWF.

Environmental Research Foundation.

<http://www.rachel.org/en/about>. The goal of the Environmental Research Foundation is to provide community groups with information that enables them to seek "environmental justice." This site is critical of government and industry and seeks to prevent the use of new technologies, including nanotechnologies, without proper study. The site also promotes safer alternatives.

Natural Resources Defense Council.

<http://www.nrdc.org/>. NRDC is one of the most effective environmental action groups in the U.S. The website is critical of dangerous and reckless actions taken by both corporations and governments and provides in-depth coverage of the NRDC program, created in collaboration with the government of China, to help manage China's environmental issues. Teachers and students will enjoy the multimedia section of the website with its interactive features, podcasts and videos.

Environment Defense Fund. <http://www.edf.org>. Advocates "market-based" solutions to global environmental issues, details efforts by corporations to address environmental problems, and provides information on the partnerships the EDF has developed with different industries to find solutions.

Riverkeeper. <http://riverkeeper.org>. This site details the work of Riverkeeper, a member-supported, non-profit environmental organization dedicated to defending the Hudson River and New York City's water supply. It also includes an extensive list of links to other environmental organizations.

New York Public Interest Research Group.
<http://www.nypirg.org>. NYPIRG is a student directed,

non-profit organization established to bring about environmental and government reform on the national, state and local level. Its goal is to train students to be advocates for environmental reform.

Greenpeace. <http://www.greenpeace.org>. Greenpeace is a worldwide activist group that has pushed governments and corporations to take action to protect the environment. The U.S. Greenpeace link provides opportunities for student activists including participation in blogs, discussion boards, and letter writing.

Other Recommended Websites

Greenhouse Gas Online. <http://www.ghgonline.org>. While this site is probably more appropriate for teachers and college students, it does contain a teachers' resource section with slideshows that can be incorporated into lessons.

Climate Spot. <http://climatespot.com>. This site uses photographs and sensational headlines to attract the attention of its readers. It lacks the formal structure of many of the other websites, but contains a multitude of useful links.

Global Warming.Org.

<http://www.globalwarming.org>. This site claims to dispel the "myths, of global warming by exposing flawed scientific, economic and risk analysis." Its approach to resolving the problem of global warming is through "Free Market Environmentalism." The site is maintained by the Competitive Enterprise Institute, a non-profit public policy group dedicated to promoting free enterprise and limited government. While many environment-alists disagree with the positions presented by this organization, the website cites a vast array of information from legitimate and credible sources.

The Current Mass Extinction.

<http://www.well.com/~davidu/extinction.html>. This website contains an up to date, exhaustive list of reports, articles, and links to sources describing the dangers of the mass extinction of many plant and wildlife species.

Benchmark Education National Geographic Lynn Ahlquist Lahlquist4@hotmail.com 856-218-0569 or 877-236-2465	Timothy Powers - NYSTROM P:908-403-1830 F:201-689-3179 www.nystromnet.com tcpowers@herffjones.com	New Jersey Center for Civic and Law-Related Education P: 732-445-3413 F: 732-445-3420 http://civiced.rutgers.edu
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Journey To Planet Earth: A Documentary Teaching Tool

by Kristin Joseph and Suzy Mellen

Journey to Planet Earth is available for educational use. Purchase price includes public performance rights for classroom use. Contact: Screenscope, Inc. (<http://www.screenscope.com>) 4330 Yuma St., NW, Washington, DC 20016 (Phone: 202/364-0055 / Email: screenscope@screenscope.com / Fax: 202/364-0058). The ten-episode set costs \$1099 plus shipping and handling. Any five episodes are available for \$599 plus shipping and handling. Single episodes are available for \$149 plus shipping and handling.

JOURNEY TO PLANET EARTH



Journey to Planet Earth is a ten-part documentary, produced by PBS that looks at the way humans interact with and impact on the world. Narrators include Kelly McGillis and Matt Damon. The series examines environmental concerns through historical, social, political, economic, and scientific lenses to provide a complete picture of the current state of the world. Each episode is embedded with thought-provoking questions that press viewers to think critically about his or her own relationship with the Earth. Episodes include “Rivers of Destiny” (focusing on the Mississippi, Jordan, Amazon, and Mekong Rivers), “The Urban Explosion” (with reports from Mexico City, Istanbul, Shanghai and New York City), “Land of Plenty, Land of Want” (challenges facing farmers in Zimbabwe, China, France and the United States), and “Hot Zones” (exploring the spread of infectious diseases in Kenya, Peru, Bangladesh, and the United States). The common thread is the necessity of achieving a balance between the needs of people and the needs of the environment.

The documentaries are supported by a website (<http://www.pbs.org/journeytoplanetearth/about/index.html>) rich with information for everyone from the eco-serious to the eco-curious. It includes brief clips from episodes, teacher guides, curriculum-oriented projects, and an “action kit” of hands-on materials for students. The kit is divided into four broad themes related to the content of the series – Soil, Water, Air and Human Health. The site also has a section with stories from communities all over the world battling to improve the environment.

Key questions for social studies classrooms that are addressed in the series are: How have changing climates, uncontrolled development, and loss of natural habitat impacted our world? What is the impact of global warming? How have societal changes such as industrialization, globalization, capitalism, and consumerism impacted on natural environments? How do overpopulation, global warming, political instability, and government (in)action affect the availability of basic human necessities? What is the state of the planet and what can we do to remedy it?

1. How have changing climates, uncontrolled development, and loss of natural habitat impacted our world? Several episodes of the series lend themselves to answering this key thematic question. In “Land of Plenty, Land of Want,” problems facing the world’s farmers are addressed. Can we feed more and more people without impoverishing the land? In the Yangtze River Delta of China, the land is being depleted from over-cultivation. In Africa, where there is widespread hunger, White commercial farmers own most of the fertile land. In the United States, only 2% of the population works the land to produce crops. The episode examines an agricultural family in

Pennsylvania, experimenting with new technologies in an attempt to salvage the last of the fertile soil in the area. The episode requires students to consider the implications of these conditions for the future.

2. What is the impact of global warming? The impact of global warming on the environment is a major theme in a number of the episodes including “State of our Planet Earth,” “The State of our Planet’s Wildlife,” and “The State of our Ocean’s Animals.” Global temperatures are rising at a faster rate than at any other time in recorded history. If sea ice continues to melt around the Antarctic at its current pace, emperor penguins will become extinct. If sea levels continue to

rise, our world's wetlands and marshes (prime breeding grounds for a variety of species) will be destroyed. Rising sea levels also puts a variety of ocean animals in danger as well, if they lose their nesting beaches. The series encourages students to accept that "global warming is a reality" and challenges them to re-evaluate their relationship with our environment.



Graffiti expresses frustration of inner-city residents

3. How have societal changes such as industrialization, globalization, capitalism, and consumerism impacted on natural environments? While we credit much of our success as a civilization to the development of technology and industry, they also have negative implications. "The Urban Explosion" takes a critical look at the ways in which the Earth is suffering from their affects. As a result of overpopulation and land exploitation, areas of Mexico City have been declared hazardous to human health and rivers are polluted with raw sewage and toxic industrial waste. In New York City, Harlem has been plagued with high rates of asthma because of poor air quality. In Shanghai, millions of people find themselves looking for work, housing, food, and transportation. This episode urges viewers to examine and accept their own role in the depletion of the Earth's natural resources.

4. How do overpopulation, global warming, political instability, and government (in)action affect the availability of basic human necessities? Unfortunately, as the episodes "The State of our Planet" and "Hot Zones" illustrate, geographic inequity is commonplace. Many regions are unable to benefit from their own resources. Over a billion people are deprived of clean drinking water and more than 100 million children

under the age of five will be malnourished by 2020. In developing countries, raw sewage, over-fishing, and agricultural run-off are slowly destroying the ecosystem of lakes and spreading disease. Overpopulation, coupled with poor governmental responses, is devastating possibilities for the future. The consequences of inaction are immense.

5. What is the state of the planet and what can we do to remedy it? In many ways, the most important challenge to the state of the planet is recognizing the severity of the problems that lie ahead. It took until about 1800 for the planet's population to reach one billion people. The world's population has grown more in the past fifty years than in the preceding 4 million years and it is increasing by nearly 80 million people each year – 220,000 each day. Overpopulation, global warming, infectious diseases, political instability, governmental inaction, hunger, and poor sanitation all contribute to the problems facing planet Earth. The "State of our Planet" episode urges its audience to keep the faith, remain hopeful, and act for change.



In Bangladesh, boats in a dry river bed

It is very important that social studies teachers provide students with connections that are meaningful, relevant, and encourage them to want to make a difference. The *Journey to Planet Earth* series encourages students to think critically about how overpopulation, urbanization, capitalism, consumerism, global warming, wildlife extinction, political instability, and infectious diseases intertwine to affect the state of the planet and our lifestyles. It also speaks to eco-serious and eco-curious individuals who can work together to reverse dangerous trends threatening the planet and human existence. While this series is expensive to purchase, it is worth the investment.

Impact of Humans on the Environment and the Environment on Human History

by Frank Maniscalco

In recent decades, archeologists and climatologist have reconstructed the history of environmental changes over the past 5000 years. Prior to the Industrial Revolution (starting roughly in 1750), human activity did not significantly affect global climate, although it did impact on local environments. An examination of human-induced changes on local environments in the past and devastating natural events on human populations raises serious concerns about contemporary environmental changes, especially those associated with “global warming.”

The impact of human civilization on local environments can be seen when we study ancient history in Mesopotamia, Egypt, China, and Central America. In each region, human activity changed the environment through farming, animal herding, and settlements that become centers for population, culture, and commerce. The more successful ancient societies were, the more population expanded, and the more demands they made on local environments.

Since pre-historic times, the expansion of human settlement has meant the extinction of plants and animals and the destruction of ecosystems by deforestation, slash and burn methods and by draining marshlands. The cultivation of food crops meant the replacement of naturally occurring local plant species. The invention of metal tools and weapons and their use in hunting led to extinction for many large mammals. Later, urban centers and irrigation meant diverting the water from its natural flow. One of the most dramatic changes was the over-cultivation and over-grazing of land in North Africa, which contributed to the formation of the Sahara Desert starting about 3000 BC.

Eugene Linden, in *The Winds of Change: Climate, Weather, and the Destruction of Civilizations* (Simon & Schuster, 2006), argues that climate change is a “serial killer” that has been a major accomplice in the fall of many civilizations, including those of the ancient Middle East. A period of relatively sudden cooling and drying about 8,000 years ago led to the collapse of the first cities in the Fertile Crescent. About 2,200 B.C., decades of drought accompanied by hot, dry winds led to the collapse of the Akkadian

civilization in Mesopotamia. At its peak, Akkad controlled territory stretching from the Tigris-Euphrates Rivers to Syria and Lebanon. Entire cities were abandoned relatively quickly. In both cases, increased population during years of plentiful harvests meant that demand for food outstripped supply when conditions became harsher.



The Fertile Crescent

One problem with the development of agriculture was the tendency to focus on a limited number of food crops. While this could promote tremendous population growth and support state formation, culture, and learning, it also left societies vulnerable if crops failed. The potato, which originated in the Andes Mountain of South America, was introduced in Europe as a major food crop in the 17th and 18th centuries. In Ireland, it quickly emerged as the main staple in the local diet, and contributed to population growth, between 1750 and 1845, from about 2.5 million to over 8 million people. When a fungus destroyed the potato crop in Ireland between 1845 and 1852, it disrupted the entire society. Millions of people either migrated or starved.

Human activity is not always the villain in environmental catastrophes. Historians generally place the end of the Roman Empire and the ancient Mediterranean civilizations in the 6th century. Explanations for the collapse of Rome usually focus on outside invaders and internal corruption. However

David Keys, author of *Catastrophe: An Investigation into the Origins of the Modern World* (NY: Ballantine, 2000) blames the eruption of the volcano Krakatoa in the Sunda Strait between Java and Sumatra in Indonesia. In magnitude, it was two hundred thousand million times the force of the nuclear bomb dropped on Hiroshima at the end of World War II.

The eruption of Krakatoa in 535 A.D. released an enormous volume of ash and sulfur dioxide into the atmosphere that was distributed by winds worldwide. The microscopic ash blocked sunlight causing global temperatures to drop and plunging the Earth into a prolonged winter. This led to unexpected frost, famine, drought, and floods around the world.



The eruption of Krakatoa forced nomadic tribes in Eurasia to leave their traditional homelands in search of food. They were horse-based cultures and excellent mobile warriors. As each group moved west, they forced other groups to migrate, until they began to invade and destabilize Rome. At the same time, the Roman Empire was weakened by a bubonic plague epidemic caused by bacteria that thrived in the cooler environment. Not only did the plague kill millions of people, but it disrupted trade, interrupted tax revenues, and led to major cutbacks in the Roman army.

Keys also credits the eruption of Krakatoa with the emergence and spread of Islam. Prior to 535, Yemen, located at the southern tip of the Arabian Peninsula, was the central power in the region with advanced knowledge and a high-level of skill in engineering that produced a network of dams. By 550, the dams were in disrepair, Yemeni society was in a state of collapse, and local people were migrating north to Medina and Mecca where population growth contributed to social

crisis. It was in this milieu that Mohammad began to teach in an effort to unify the Arab tribes.

Climate change was not always so sudden, but gradual change could also have a sharp impact on history. In the 10th century, the Earth's climate began to get warmer as part of a natural cycle of temperature variation. This period, known as the Medieval Warming Period, lasted until the 14th century. It allowed the Vikings in Scandinavia to take advantage of ice-free seas to colonize Greenland and other outlying lands in the North Atlantic. The Medieval Warming Period was followed by a Little Ice Age that lasted until the middle of the 19th century. During the Little Ice Age, glaciers in the Swiss Alps advanced, gradually engulfing farms and crushing entire villages. Sea ice surrounding Iceland extended for miles in every direction, closing that island's harbors to shipping and virtually isolating it from the rest of the world. Finland lost a third of its population to starvation and disease. The Thames River in London, the canals and rivers of the Netherlands, and New York harbor frequently froze during the winter. European peasants, faced with famine and hypothermia, rioted demanding bread and toppled governments, most notably the French monarchy. They also participated in the religious upheaval of the Protestant Reformation and the One Hundred Year War.

Since the middle of the 19th century, the Industrial Revolution has spewed carbon, in the form of carbon dioxide, into the atmosphere. Carbon dioxide levels in the atmosphere are now higher than any other period of time and the average global temperature is rising. Balanced ecosystems are being disturbed, organisms are becoming extinct at alarming rates, invasive species are entering new habitats, and some habitats, such as coral reefs, are in danger of disappearing.

It is hard to imagine the extent of environmental changes in the near future that will be brought about by human action. Storms appear to be growing more severe and glaciers are melting. Forests, which naturally process carbon dioxide and release oxygen are being cut down. Phytoplankton, which live in shallow seas, supply the earth with the majority of oxygen. They are dying as the ocean waters warm. Fresh water lakes are dying from the high acid content of rain caused by the burning of fossil fuels. If history is any indication, even small environmental disruption will have a great impact on human civilization.

Why We Need the Ozone Layer

by Anthony Geremina

The history of life on Earth began approximately 2.5 billion years ago. Since then, hundreds of millions of species, most of which are now extinct, lived on this planet. Human beings, who in their modern form have been around less than 100,000 years, have had the greatest negative impact on the Earth's environment of any of these species. Most of this destruction has taken place in the last 250 years, the period since the start of the Industrial Revolution. One area where human impact on the environment can be directly measured is the Ozone Layer in the atmosphere, which in 1985, scientists discovered was being destroyed by human action. The history of the Ozone Layer also suggests some possibility for hope, as a concerted international response has helped it start to recover.

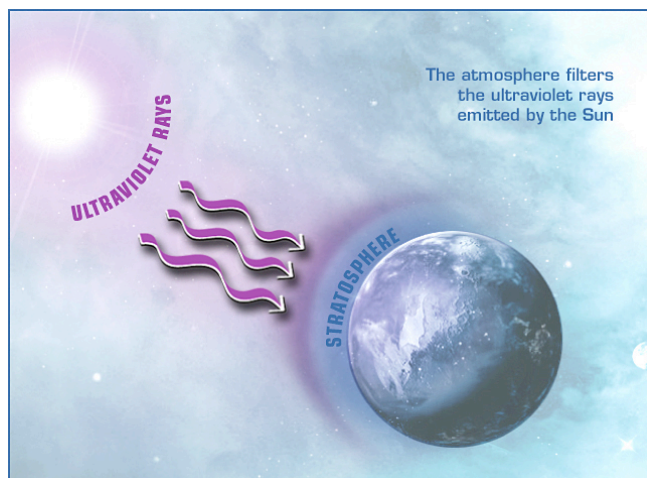
The Earth's atmosphere is the layer of gases that extend from the surface of the Earth's crust and oceans to approximately 300 to 400 miles into space, although most gas is located in the first 100 miles above the surface. The atmosphere primarily consists of nitrogen (78%) and oxygen (21%). Other gasses occur in much smaller amounts. They include hydrogen, helium, water vapor, methane, and carbon-dioxide. Carbon dioxide, which has a great impact on temperature, actually makes up less than .04% of the atmosphere.

The Ozone Layer was discovered in 1913 by Charles Fabry and Henri Buisson, two French physicists. Properties of the Ozone Layer were further explored in detail by the British meteorologist G. M. B. Dobson, who developed a device that measures stratospheric ozone from the ground. Between 1928 and 1958, Dobson established a worldwide network of ozone monitoring stations which continues to operate today. Because of his extensive work on the Ozone Layer, a convenient measure of the total amount of ozone in a column of air is named in his honor, the "Dobson Unit."

The Ozone Layer is a protective layer of gas that completely surrounds the Earth. It consists of O_3 molecules formed when free oxygen, O_1 , bonds to normally occurring O_2 oxygen molecules. This molecular formation is caused by ultra-violet radiation produced by the Sun. The Ozone Layer is located between about 10 and 15 miles above the surface of Earth in a region known as the stratosphere and it is approximately 4-5 miles thick.

The Ozone Layer is a natural, protective barrier between the Sun and life on the Earth's surface. The Sun emits solar radiation that is either absorbed by the Earth's surface or reflected back into space. One form of solar radiation is ultra-violet or UV radiation. Ultra-violet radiation, which occurs in three varieties (UV-A, UV-B, and UV-C), is a relatively high energy, short

wave radiation that can be very dangerous to living organisms. UV-A rays commonly cause skin aging, wrinkling, and mild sunburn. UV-B rays cause more severe sunburns and can also cause cataracts, immune system damage, and skin cancer. UV-C rays are the most dangerous. They cause intense sunburns, skin cancer, immune system damage, and even result in cell damage and genetic mutation. The stratospheric Ozone Layer completely blocks out UV-C rays and most of the Sun's UV-B rays. It does not, however have any measurable affect on UV-A rays, which is why we use sunscreen and skin creams and wear sunglasses.



http://www.space.gc.ca/asc/img/spacesuit_2_3_1_A.jpg

Since 1928, humans have been using a non-flammable chemical compounds known as Chlorofluorocarbons, or CFCs, in a number of products. CFCs, which can last over one hundred years in the atmosphere, were originally developed for use as a cooling agent in refrigerators. Later, they were used in fire extinguishers and as propellants in aerosol cans, and in the production of dry cleaning chemicals, pesticides, degreasers, and adhesives. The use of CFCs led to a major depletion of atmospheric ozone and

damage to the Earth's Ozone Layer. When UV rays come into contact with CFC molecules in the atmosphere, the UV radiation causes a chlorine atom to break away from the rest of the molecule. In a pinball like affect, the chlorine collides with ozone (O₃) molecules and they begin to break up, forming regular oxygen (O₂) and chlorine monoxide.



<http://www.ci.arlington.tx.us/cleanair/images/ozone.gif>

A “hole” in the Ozone Layer began to form over Antarctica in the 1970s. By 2000, the hole had become so large that populated areas of southern Chile were exposed to unfiltered UV rays. Some scientists hypothesized that ozone depletion also added to global warming as more solar radiation penetrated the atmosphere and was absorbed by the Earth's surface.

After discovery of the ozone hole, many of the major industrialized nations realized that something had to be done to reverse the affects of CFCs on the Ozone Layer. In 1985, the Vienna Convention for the Protection of the Ozone Layer outlined national responsibilities for protecting human health and the environment against the adverse effects of ozone depletion. In 1987, the Montreal Protocol on Substances that Deplete the Ozone Layer was signed (it was later amended in 1990 and 1992). It stipulated

that the production and consumption of most compounds resulting in the depletion of stratospheric ozone be phased out by the year 2000. Studies show 95% of the ozone-depleting substances are no longer made or used. Scientists project that between the years 2050 to 2075 the Ozone Layer natural processes should restore the Ozone Layer. The elimination of CFCs has also helped reduce greenhouse gases in the atmosphere that contribute to global warming.

Although the current prognosis for the Ozone Layer looks positive, the outlook for other major environmental problems, including global warming, does not appear to be so optimistic. Unless the major industrialized nations of the world, including the United States and newly expanding China and India, come to a reasonable agreement on the outline for an environmental protection plan very soon, the human species may end up joining other extinct species that could not adapt to environmental changes.

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The National Oceanic and Atmospheric Administration (NOAA) is a U.S. government within the Department of Commerce. Its mission is to understand and predict changes in Earth's environment and conserve and manage coastal and marine resources to meet our Nation's economic, social, and environmental needs. Their website, <http://www.noaa.gov>, includes excellent teacher and student resources for learning about the environment.

Nobel Peace Prize Committee Honors Struggle Against Global Warming

by Beverly Milner (Lee) Bisland

The Nobel Peace Prize for 2007 was awarded to the Intergovernmental Panel on Climate Change (IPCC), a scientific body set up by the World Meteorological Organization and by the United Nations Environment Program and to former United States vice-president, Albert (Al) Gore, Jr. The Nobel Committee praised the United Nations panel for creating an “ever broader informed consensus about the connection between human activities and global warming.” They called Gore “the single individual who has done most to create greater worldwide understanding of the measures that need to be adopted.”

The IPCC is made up of 2,000 scientists worldwide and is considered the world’s leading authority on climate change. At its inception, critics who questioned the scientific basis for a human role in climate change had disparaged the IPCC. Upon accepting the peace prize, Rajendra Pachauri, the Indian climatologist who heads the panel, said that science had won out over skepticism.

By giving the Nobel Peace Prize to the IPCC and Al Gore, the Nobel Committee has continued to recognize issues that, while removed from armed conflict, are critical concerns to world peace and stability. In recent years, the Nobel Peace Prize has been given to individuals and organizations involved in social justice, poverty remediation, and environmentalism. In explaining their decision, the committee delineated how the issue of climate change and global warming relates to the issue of armed conflicts. They pointed out that changes in climate alter and threaten how mankind lives. They lead to massive migrations of people and competition for a declining amount of resources. At greatest risk will be the earth’s most vulnerable countries and the danger of violent conflicts both within and between states will increase. Recent examples of the effect of climate on human populations can be seen in the recent cyclone in Myanmar and flooding in Bangladesh. In Africa, particularly in the Darfur region of Sudan, drought has caused migration across national boundaries and civil unrest.

The depletion of resources and migration of peoples challenges the traditional political concept of the nation-state and adds to both political and economic globalization around the world. National

boundaries blur and the individual loyalties of citizens focus on their regional, linguistic, religious, or ethnic groups that cross the boundaries of nation-states.

Former Vice-President Al Gore is the American politician most associated with advocacy for environmental causes. In particular, he makes the case for action to control emissions of gases that scientists say are changing the earth’s climate. He calls the need to reduce carbon dioxide emissions a moral imperative. Since the election of 2000, Gore has devoted himself to educating the public. His film on global warming, *An Inconvenient Truth* (2006), won an Academy Award for best documentary. In the film, Gore traces his interest in global warming from his years as an undergraduate at Harvard University in the 1960s through his career in the House of Representatives and the Senate.

An Inconvenient Truth is based on Al Gore’s book, *An Inconvenient Truth: The Planetary Emergency of Global Warming and What We Can Do About it* (2006). It explains complex information using stark and powerful images. Graphs illustrate increased rates of carbon-dioxide emissions and the rise in earth’s temperature. Time-lapse photographs show receding ice fields and glaciers and computerized projections of coastlines submerged in the future. The film is an excellent starting point for further investigations of global warming.

In a press conference after receiving the Nobel Peace Prize, Gore said, “I will accept this award on behalf of all the people that have been working so long and so hard to try to get the message out about this planetary emergency.” He announced that he would give his half of the \$1.5 million prize money to the Alliance for Climate Protection. The Alliance’s mission is to “persuade the American people – and people elsewhere in the world – of the importance and urgency of adopting and implementing effective and comprehensive solutions for the climate crisis.”

The mandate of the IPCC is the impartial and objective assessment of climate change. The panel assesses the latest worldwide literature that strengthens the understanding of the risk of human-induced climate change. Even though its membership is made up of scientists, the panel does not conduct research or monitor climate data. The first report of the IPCC in

1990 served as the basis for negotiating the United Nations Framework Convention on Climate Change (UNFCCC). The nations who signed this convention agreed to develop national inventories of greenhouse gas emissions and to establish programs to reduce emissions and lessen climate change. By 2003, 190 nations, including the United States, had signed.

In the 1990s a new agreement was developed that included legally binding, rather than voluntary, commitments. The IPCC Second Assessment Report of 1995 provided key input for the development of the Kyoto Protocol in 1997, which capped greenhouse admissions. In this international agreement industrialized nations agreed to substantially reducing their emissions of greenhouse gases, primarily consisting of carbon dioxide concentrations, by 2012. More than 160 countries committed to the agreement.

Unfortunately, there were disagreements among the parties at Kyoto. A number of the large developing nations, which included China and India, did not want to make binding commitments to reduce emissions. Other points of conflict were over appropriate greenhouse and carbon removal methods, such as planting forests as opposed to reducing factory emissions. The United States signed the Kyoto Protocol, but the United States Senate never ratified the treaty. Ratification would mean that the U.S. agreed to reduce greenhouse gas emission to 7 percent below 1990 levels by 2012. In December 2007, 180 countries met in Indonesia to consider a new round of negotiations on greenhouse emissions limitations.

Climate Change and Social Studies

Climate change is a topic that lends itself to the integration of subject areas within a combined unit of study. Students can examine the scientific basis for global warming (science), measure changes in water-level and ice fields (math), conduct research and write reports about climate change (language arts and technology), and grapple with social, political, and economic factors resulting from climate change (social studies). A number of New York and New Jersey social studies standards can be addressed through a study of climate change and global warming. They include the following:

State and United States History: Climate change affects New York, New Jersey, and the United States.

Students can study the increase in significant storm systems, flooding, and droughts and the effect they have on governmental systems and profit and non-profit organizations. The aftermath of Hurricane Katrina in New Orleans is one of many examples.

World History: Students can study how climate change such as storm systems, flooding, and drought impact on countries, regions, and continents. Examples are drought in Africa and flooding in south and southeast Asia.

Geography: Place, relative location, human and environmental interaction, movement, and regions are influenced by climate change. Examples are the movement of people from Darfur across national boundaries and the controversy over water rights in the southeastern U.S. caused by a prolonged drought.

Economics: Climate change affects national, regional, and world economic systems. Students can study how nations such as the United States create greenhouse gases through the production of goods and the consumption of natural resources. These practices affect the economies of more vulnerable countries whose populations are dependent on agriculture that is directly impacted by climate change.

Civics, Citizenship, and Government: New York and New Jersey social studies standards emphasize civic education as preparation for being an effective citizen of the United States. New Jersey learning standards state that “students must also be prepared to serve as global citizens; that is, students must be aware that the United States has a significant impact on the rest of the world, and conversely, the rest of the world impacts the United States.” Climate change and global warming are topics that lend themselves to developing the concept of global citizenship. As students investigate issues at the local, national, and international level, they can also discuss solutions to the problems of global warming and increase their awareness of actions and dispositions necessary for global and environmental citizenship.

The Impact of Global Warming: A Fact Sheet

by Atia Pasha

The reality of global warming and its cause are not disputed in the scientific community. The debate is over the rate of warming, its short-term and long-term impact, and the ability of concerted and cooperative human effort to reverse the trend. Global warming is the increase in the average temperature of the Earth's surface. The term average is very important. Global climate change is not uniform; individual locations may experience lower temperatures and more severe winters. Even in areas that are warming, there will continue to be cold days.

Global warming is caused by the release of greenhouse gases into the atmosphere. They include carbon dioxide, methane, and nitrous oxide. When sunlight reaches the Earth, part of it is absorbed by the land and water, and some is reflected back into space. Greenhouse gases form a layer in the atmosphere that prevents the reflected light from leaving the Earth's atmosphere, making the planet warmer.

The average temperature on the surface of the Earth has risen by about half a degree Celsius over the past 100 years with temperatures predicted to increase 1.4 to 5.8 degrees Celsius by 2100. Concentrations of carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O), have all increased markedly during the past 200 years as a result of human activities, especially the burning fossil fuels like coal, oil and gas. Ice core samples show that the atmospheric concentration of CO₂ has increased by 31 percent since 1750, with three-quarters of this increase in the past 20 years.

The Kyoto Protocol was negotiated under the auspices of the United Nations between 1995 and 1997. It was an effort to control global warming by setting a goal for industrialized nations of reducing their greenhouse gas emissions by a collective average of 5% below 1990 levels. The protocol expires in 2012 and international talks began in 2007 to draft a new treaty. Although over 170 countries eventually signed the Kyoto Protocols, it never became fully effective. Many countries delayed signing so it did not go into effect until 2005. The United States, the world's largest polluter, has still refused to ratify the agreement and newly emerging industrial polluters such as China and India are not covered. New York and New Jersey are

among eight states involved in a Regional Greenhouse Gas Initiative supporting the Kyoto goals.

Impact of Global Warming on the United States

The U.S. has *already* started to warm. All fifty states experienced either "above normal" or "much above normal" average temperatures in 2006, the second warmest year on record for the country. Every year from 1998 through 2006 ranked among the top 25 warmest years on record, an unprecedented occurrence.

Drought and Wildfires: Warmer temperatures mean greater evaporation of ground water and increased possibility of drought and wild fires. The 1999-2002 national drought was one of the three most extensive droughts in the last 40 years. The 2006 wild land fire season set new records in both the number of reported fires, close to 100,00, as well as acres burned, nearly 10 million.

Storms: Intense rain events, including category 4 and 5 hurricanes, have increased in frequency during the last fifty years. Warmer oceans pump more energy into tropical storms, making them more intense and destructive. The 2005 Atlantic hurricane season was the most active in recorded history, with a record twenty-seven named storms, of which fifteen became hurricanes. Seven of the hurricanes strengthened into major storms, five became Category 4 hurricanes and a record four reached Category 5 strength. Hurricane Katrina in August 2005 was one of the costliest and deadliest hurricanes in U.S. history.

Human Mortality: More frequent and more intensive heat waves will result in more heat-related deaths. In 2003, extreme heat waves claimed an estimated 35,000 lives in Europe. Conditions will aggravate local air quality problems, already afflicting more than 80 million Americans. Global warming is also expected to increase the geographic range and virulence of tropical diseases such as the West Nile virus.

Bio-diversity: The increase in global temperatures is expected to disrupt ecosystems and result in loss of species diversity, as species that cannot adapt die off. The first comprehensive assessment of the extinction risk from global warming found that more than one million species could be committed to extinction by 2050 if global warming pollution is not curtailed. Some ecosystems, including alpine meadows in the Rocky

Mountains, as well as tropical forests and coastal tidal plains, are likely to disappear because new warmer local climates or rising coastal sea levels will not support them. The latest IPCC report found that

approximately 20 to 30% of plant and animal species have increased risk of extinction if average global temperature increases by more than 2.7 to 4.5 degrees Fahrenheit.

Global Warming and New Jersey

Source: <http://www.nwf.org/globalwarming/pdfs/NewJersey.pdf>

New Jersey signed a 2001 compact between Northeast governors and neighboring Canadian provincial leaders requiring a collective reduction of global warming pollution in the region. New Jersey is home to an incredible diversity of native wildlife species, including 340 birds, 71 mammals, 67 fish, 42 reptiles and 31 amphibians. Rising temperatures and sea level in the state will likely change the makeup of entire ecosystems, forcing wildlife to shift their ranges or adapt.

- Salt-water intrusion and inundation due to rising sea levels could greatly reduce the state's extensive coastal wetlands, harming essential foraging grounds for many wading birds and waterfowl such as the pied-billed grebe.
- The Environmental Protection Agency (EPA) estimates that forests in New Jersey will change as temperatures rise, bringing more southern pines and oaks northward to replace the hardwood forests currently found in the northern part of the state.
- The breeding range of many species of songbirds—including several different flycatchers, swallows, chickadees and warblers—may be pushed out of New Jersey in the summer. Some of these birds are important to the state not only for their beautiful sounds, but also for their appetite for gypsy moths, tent caterpillars and other invasive pests that harm vegetation.
- From the Pine Barrens of the outer coastal plain to the Atlantic beaches that attract visitors year-round, forests and water are some of New Jersey's most valued natural resources. They are also two resources very much at risk from global warming.
- The EPA estimates average temperatures in New Jersey could rise about 4 degrees Fahrenheit by 2100 if global warming continues unabated.
- Sea level is expected to rise along the state's 1,792 miles of shoreline by up to 27 inches in the same timeframe, leaving a densely populated coast and unique tidal wetland system at great risk.
- The state adopted an action plan to reduce global warming pollution, setting a goal to cut emissions by 3.5 percent below 1990 levels by 2005 using readily-available energy conservation techniques.
- New Jersey has the potential to meet more than 31 percent of its electricity needs with renewable energy. More than 84 percent of its renewable energy potential comes from wind, with the rest from biomass and landfill gas.
- Sea level rise due to global warming could cost New Jersey's coast. The EPA estimates sand replenishment and seawall construction to protect Long Beach Island from a possible 1-3 foot sea level rise in the coming century could total between \$100-\$500 million. The Federal Emergency Management Agency estimates that a 1-foot rise in sea level could increase flood insurance premiums in New Jersey by 35-60 percent.
- Loss of wildlife and habitat could mean a loss of tourism dollars. In 2001, more than 2.3 million people spent nearly \$2.2 billion on hunting, fishing, and wildlife viewing in New Jersey, which in turn supported 35,305 jobs.

Global Warming and New York State

Source: <http://www.nwf.org/globalwarming/pdfs/NewYork.pdf>

New York State produces more carbon dioxide and pollution than many industrialized nations, including the Netherlands, Sweden, Central America, and Mexico combined. New York signed a 2001 compact between Northeast governors and neighboring Canadian provincial leaders requiring a collective reduction of global warming pollution in the region. New York is home to an incredible diversity of native wildlife species, including 327 birds, 91 mammals, 159 fish, 35 reptiles and 32 amphibians. Rising temperatures and sea level in the state will likely change the makeup of entire ecosystems, forcing wildlife to shift their ranges or adapt.

- Lower summer stream flows and higher stream temperatures due to global warming could significantly reduce viable habitat for brook trout and other cold-water fish in New York. Already, fish habitat in the Northeast is in decline due to water pollution, competition from invasive species and loss of habitat from development.
- The breeding range of many species of songbirds— including several different flycatchers, swallows and warblers—may be pushed out of New York’s borders. Cape May and bay-breasted warblers are among some important predators of pests such as the eastern spruce budworm, which can cause major damage to the state’s forests. Fewer birds mean more bugs.
- A warmer climate will likely favor more invasive species, parasites and pathogens such as the woody adelgid that is attacking hemlocks in New York’s forests.
- The make-up of forests in New York is expected to change as the climate warms faster than tree species can adapt. Sugar maples, one of the dominant species of the state’s mixed forests, may disappear entirely from the state by the end of the century.
- Loss of wildlife and habitat could mean a loss of tourism dollars. In 2001, more than 4.6 million people spent nearly \$3.5 billion on hunting, fishing, and wildlife viewing in New York, which in turn supported 60,505 jobs.
- The Environmental Protection Agency estimates average temperatures in the state could rise about 4 degrees Fahrenheit by 2100, affecting everything from New York’s forests and coastal ecosystems to the health of its residents. People living along the coast of Manhattan and Long Island could face expensive sand replenishment projects to protect them from beaches from sea level rise.
- People living in New York’s cities face more respiratory problems from increased smog, as well as more heat-related deaths. One study projects that a 1-degree rise in average temperatures could more than double heat-related deaths in New York City during a typical summer, from about 300 to more than 700.
- By mid-century, the number of summer days in Buffalo with “good” air quality could drop 17 percent, from an average of 51 days per summer to 42 days per summer. “Red alert” air quality days could increase from 2 per summer today to 5 per summer.
- New York adopted a “renewable portfolio standard” that requires 24 percent of the state’s energy come from renewable sources such as wind and biomass by 2013.
- The state has the potential to meet nearly 84 percent of its electricity needs with renewable energy such as wind. New wind farms are in the works, including one off of Long Island.

We Can Make A Difference – New York Energy Smart Student Programs

The New York State energy smart program provides free curricular material aligned with state K-12 learning standards at its website <http://www.getenergysmart.org>. It also offers workshops for teachers and grants to enhance classroom instruction. These climate smart tips to protect the earth are from the state and local climate change program of the federal Environmental Protection Administration (<http://www.getenergysmart.org/Files/Schools/FactSheets/GlobalWarming.PDF>).

There are six areas in your life in which you can take smart, feel good actions that will save you money while helping the environment. Some are things that you can do inside of your home, others are outside in your yard, when you're at the store, while you're on the road, and even when you're considering major investments. In fact, there are things you can do anywhere and everywhere.

These climate smart money-savers will reduce your use of energy and the resulting emissions of carbon dioxide, a major contributor to global warming-and other atmospheric gases that trap the heat of the Earth. Even if you do only about one-third of the actions on this list, you can reduce your emissions of heat-trapping "greenhouse gases" like carbon dioxide by 12,280 pounds per year.

Today, the United States pumps more carbon dioxide into the atmosphere more than any other country in the world. Each of us contributes about 22 tons of carbon dioxide emissions per year, whereas the world average per capita is about 6 tons.

The good news is that there are many ways you and your family can help reduce carbon dioxide pollution and improve the environment for all of us.

1. Cut your utility bills by purchasing energy efficient appliances, fixtures, and other home equipment and products. The average house is responsible for more air pollution and carbon dioxide emissions than is the average car. You can reduce your energy consumption by up to 40 percent by purchasing home products that display the Energy Star label. Most of the Energy Star labels require that products exceed minimum federal standards for energy consumption by 13 to 40 percent, depending on the particular appliance. Look for the label on refrigerators, washing machines, dishwashers, heating and cooling equipment, televisions, VCRs, and audio equipment. A high-efficiency refrigerator will reduce carbon dioxide emissions by 220 pounds a year. A washing machine that uses water and energy efficiently will reduce emissions by 440 pounds a year.

- Purchase computers, copiers, printers, fax machines, and other home office equipment that carry the Energy Star label.
 - When your light bulbs burn out, replace them with compact fluorescent bulbs. Converting to energy-efficient lighting fixtures can help you use at least 40 percent less energy for lighting.
 - Insulate your home and tune up your furnace. Potential reductions in carbon dioxide emissions: 2,480 pounds per year.
2. Save your water and energy use in your home.
- Use low flow faucets in your showers and sinks.
 - Replace toilets with water-savings units.
 - Lower the temperature on your hot water tank to 120 degrees.
 - Insulate your water heater and all water pipes to reduce heat loss.

3. When you remodel your home or build a new one, incorporate all of these energy efficiency measures. If you live in a sunny climate, install a solar thermal system to help provide your hot water. You will reduce your homes



carbon dioxide emissions by 720 pounds a year. Consider installing a solar photovoltaic system to generate electricity.

4. Purchase “Green Power” for your home’s electricity if available from your utility. Green power is electricity that is generated from renewable sources such as solar, wind, geothermal, or biomass. Although the cost may be slightly higher, you’ll know that you’re buying power from an environmentally friendly energy source.

5. Revisit your landscaping practices.

- Plant deciduous trees in strategic locations around your home, including easement areas if permitted. The shade the trees cast can reduce your energy consumption. In addition to energy savings, another benefit is that trees store carbon during photosynthesis and can remove 50 pounds of carbon in a year. Design your yard for plants that require little water.
- Use a composting lawn mower. Composting yard waste on site reduces the waste sent to your community’s landfill.
- Landfills generate a potent gas called “methane” that adds to global warming.
- Using a push mower instead of a power mower will reduce carbon dioxide emissions by 80 pounds per year.

6. Practice wise waste management

- Recycle aluminum cans, glass bottles, plastic, cardboard, and newspapers. Recycling can reduce your home’s carbon dioxide emissions by 850 pounds per year.
- Buy food and other products with reusable or recyclable packaging, or reduced packaging, to save the energy required to manufacture new containers. This simple action can reduce your emissions by 230 pounds per year.
- Buy products made of recycled content, such as recycled paper for your computer printer.

7. Rethink your transportation options.

- When running errands, combine trips so that you are not using your car for single purpose trips.
- Give your car a break – consider transportation alternatives such as public transportation and bicycle or walking to work and for errands.
- When you do drive, keep your car tuned up and the tires properly inflated to save on fuel costs.
- Carpool-leaving your car at home just two days a week will reduce your carbon dioxide emissions by 1,590 pounds per year.
- Telecommute to work, consider “flexplace” options.

8. Large-ticket purchases can have a major impact on your energy usage.

- Consider purchasing a fuel-smart car-one that gets more miles to the gallon than your current vehicle, and match the vehicle to your needs. The potential carbon dioxide reduction for a car that gets 32 miles per gallon is 5,600 pounds per year.
- Select a home located close to your job to reduce your travel distance and time.
- Take advantage of energy efficient mortgages and loans to make improvements that will save you money.
- When purchasing a new home, look for one with the Energy Star label. These homes offer energy savings as well as a higher resale value.
- Ask your contractor about high-efficiency furnaces, central air conditioners, and other heating and cooling systems that qualify for the Energy Star label. High-efficiency systems can save as much as 40 percent on heating and cooling bills.

9. Educate Others. Let friends and family know about these practical, energy-saving steps. Do these few recommendations and you’ll help make a difference for the environment and save money, too.

George W. Bush Discusses Climate Change and the Kyoto Protocols

Source: <http://www.whitehouse.gov/news/releases/2001/06/20010611-2.html>

Former United States President George W. Bush made a number of claims about global warming and the Kyoto Protocols in this speech, delivered June 11, 2001. While he accepted the reality of global warming, he had many questions about the human role. He also felt the Kyoto Protocols were flawed because they would injure the economies of advanced countries and ignored pollution by newly industrializing nations. Read this edited version of his speech. Write a statement expressing your views on global warming and the Kyoto Protocols.

Climate change, with its potential to impact every corner of the world, is an issue that must be addressed by the world. The Kyoto Protocol was fatally flawed in fundamental ways. But the process used to bring nations together to discuss our joint response to climate change is an important one. That is why I am today committing the United States of America to work within the United Nations framework and elsewhere to develop with our friends and allies and nations an effective and science-based response to the issue of global warming.

We know the surface temperature of the earth is warming. There is a natural greenhouse effect that contributes to warming. Greenhouse gases trap heat and warm the earth because they prevent a significant proportion of infrared radiation from escaping into space. Concentrations of greenhouse gases, especially CO₂, have increased substantially since the beginning of the industrial revolution.

The National Academy of Sciences indicates that the increase is due in large part to human activity. Yet, the Academy's report tells us that we do not know how much effect natural fluctuations in climate may have had on warming. We do not know how much our climate could, or will change in the future. We do not know how fast change will occur, or even how some of our actions could impact it. The policy challenge is to act in a serious and sensible way, given the limits of our knowledge. While scientific uncertainties remain, we can begin now to address the factors that contribute to climate change.

There are only two ways to stabilize concentrations of greenhouse gases. One is to avoid emitting them in the first place; the other is to try to capture them after they are created. There are problems with both approaches. We are making great progress through technology, but have not yet developed cost-effective ways to capture carbon emissions at their source. A growing population requires more energy to heat and cool our homes, more gas to drive our cars, even though we are making progress on conservation and energy efficiency and have significantly reduced the amount of carbon emissions per unit of GDP.

Our country, the United States is the world's largest emitter of man-made greenhouse gases. We account for almost 20 percent of the world's man-made greenhouse emissions. We also account for about one-quarter of the world's economic output. We recognize the responsibility to reduce our emissions. We also recognize the other part of the story -- that the rest of the world emits 80 percent of all greenhouse gases. Many of those emissions come from developing countries.

The world's second-largest emitter of greenhouse gases is China. Yet, China was entirely exempted from the requirements of the Kyoto Protocol. India and Germany are among the top emitters. Yet, India was also exempt from Kyoto. These and other developing countries that are experiencing rapid growth face challenges in reducing their emissions without harming their economies. We want to work cooperatively with these countries in their efforts to reduce greenhouse emissions and maintain economic growth.

Kyoto is, in many ways, unrealistic. Many countries cannot meet their Kyoto targets. The targets themselves were arbitrary and not based upon science. For America, complying with those mandates would have a negative economic impact, with layoffs of workers and price increases for consumers. When you evaluate all these flaws, most reasonable people will understand that it's not sound public policy. That is why 95 members of the United States Senate expressed a reluctance to endorse such an approach.

America's unwillingness to embrace a flawed treaty should not be read by our friends and allies as any abdication of responsibility. To the contrary, my administration is committed to a leadership role on the issue of climate change.

Al Gore: “It is Time to Make Peace with the Planet”

Al Gore, former Vice-President of the United States, was awarded a Nobel Peace Prize in 2007 for his work educating the public about the dangers of global warming. This is an excerpt from his acceptance speech. Compare Gore’s speech with the 2001 statement by President George W. Bush. Where do they agree? Where do they disagree? Whose views come closest to yours? Explain why.

A. We, the human species, are confronting a planetary emergency – a threat to the survival of our civilization that is gathering ominous and destructive potential even as we gather here. But there is hopeful news as well: we have the ability to solve this crisis and avoid the worst . . . of its consequences, if we act boldly, decisively and quickly.

B. Today, we dumped another 70 million tons of global-warming pollution into the thin shell of atmosphere surrounding our planet, as if it were an open sewer. And tomorrow, we will dump a slightly larger amount, with the cumulative concentrations now trapping more and more heat from the sun. As a result, the earth has a fever. And the fever is rising. The experts have told us it is not a passing affliction that will heal by itself. We asked for a second opinion. And a third. And a fourth. And the consistent conclusion, restated with increasing alarm, is that something basic is wrong. We are what is wrong, and we must make it right.

C. It has been harder and harder to misinterpret the signs that our world is spinning out of kilter. Major cities in North and South America, Asia and Australia are nearly out of water due to massive droughts and melting glaciers. Desperate farmers are losing their livelihoods. Peoples in the frozen Arctic and on low-lying Pacific islands are planning evacuations of places they have long called home. Unprecedented wildfires have forced a half million people from their homes in one country and caused a national emergency that almost brought down the government in another. Climate refugees have migrated into areas already inhabited by people with different cultures, religions, and traditions, increasing the potential for conflict. Stronger storms in the Pacific and Atlantic have threatened whole cities. Millions have been displaced by massive flooding in South Asia, Mexico, and 18 countries in Africa. As temperature extremes have increased, tens of thousands have lost their lives. We are recklessly burning and clearing our forests and driving more and more species into extinction. The very web of life on which we depend is being ripped and frayed.

D. Science is warning us that if we do not quickly reduce the global warming pollution that is trapping so much of the heat our planet normally radiates back out of the atmosphere, we are in danger of creating a permanent “carbon summer” . . . It is time to make peace with the planet. We must quickly mobilize our civilization with the urgency and resolve that has previously been seen only when nations mobilized for war. These prior struggles for survival were won when leaders found words at the 11th hour that released a mighty surge of courage, hope and readiness to sacrifice for a protracted and mortal challenge . . . Now comes the threat of climate crisis – a threat that is real, rising, imminent, and universal. Once again, it is the 11th hour. The penalties for ignoring this challenge are immense and growing, and at some near point would be unsustainable and unrecoverable. For now we still have the power to choose our fate, and the remaining question is only this: Have we the will to act vigorously and in time, or will we remain imprisoned by a dangerous illusion?

E. The way ahead is difficult. The outer boundary of what we currently believe is feasible is still far short of what we actually must do. Moreover, between here and there, across the unknown, falls the shadow . . . We have everything we need to get started, save perhaps political will, but political will is a renewable resource. So let us renew it, and say together: “We have a purpose. We are many. For this purpose we will rise, and we will act.

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Kearny, New Jersey High School Student Challenges Textbook Bias

A. “Student Sees Problems With H.S. Text” by Nancy Zuckerbrod (Associated Press), April 8, 2008

Source: http://ap.google.com/article/ALeqM5jbrQTGcd9yRqQEuE_5cArsv8kvwD8VTVOE80

Talk about a civics lesson: A high-school senior has raised questions about political bias in a popular textbook on U.S. government, and legal scholars and top scientists say the teen’s criticism is well-founded. They say “American Government” by conservatives James Wilson and John Dilulio presents a skewed view of topics from global warming to separation of church and state. The publisher now says it will review the book, as will the College Board, which oversees college-level Advanced Placement courses used in high schools.

Student Matthew LaClair of Kearny, N.J., recently brought his concerns to the attention of the Center for Inquiry, an Amherst, N.Y., think tank that promotes science and which has issued a scathing report about the textbook. “I just realized from my own knowledge that some of this stuff in the book is just plain wrong,” said LaClair, who is using the book as part of an AP government class at Kearny High School . . . LaClair said he was particularly upset about the book’s treatment of global warming. James Hansen, the director of NASA Goddard Institute for Space Studies, recently heard about LaClair’s concerns and has lent him some support.

Hansen has sent Houghton Mifflin a letter stating that the book’s discussion on global warming contained “a large number of clearly erroneous statements” that give students “the mistaken impression that the scientific evidence of global warming is doubtful and uncertain.”

The edition of the textbook published in 2005, which is in high school classrooms now, states that “science doesn’t know whether we are experiencing a dangerous level of global warming or how bad the greenhouse effect is, if it exists at all.” A newer edition published late last year was changed to say, “Science doesn’t know how bad the greenhouse effect is.” The authors kept a phrase stating that global warming is “enmeshed in scientific uncertainty.”

While there are still some scientists who downplay global warming and the role of burning fossil fuels, the overwhelming majority of climate scientists and peer-reviewed scientific research say human activity is causing climate change. Last year an international collection of hundreds of scientists and government officials unanimously approved wording that said the scientific community had “very high confidence,” meaning more than 90 percent likelihood, that global warming is caused by humans.

B. Letter from Michael MacCracken, Chief Scientist for Climate Change Programs with the Climate Institute in Washington DC, to James Q. Wilson and John J. DiIulio, Jr., April 3, 2008

Through a student at a New Jersey public high school, the discussion on climate change contained in your textbook *American Government: Institutions and Policies* (Tenth Edition) was recently brought to my attention. As a scientist who has worked on the science and impacts of human-induced climate change for more than three decades (a brief biographical sketch is appended), I was both surprised and disappointed in the discussion. Most importantly, the discussion is seriously out-of date and really fails to explain the unprecedented joint effort of the international scientific and political communities to create the Intergovernmental Panel on Climate Change (IPCC) that has, since 1990, gained unanimous endorsement by the nations of the world of the four comprehensive assessment reports that it has completed. These IPCC assessments provide a very solid base of expert information for consideration and use by decision makers in individual nations and the world community as a whole.

While scientific, technological, and social sciences research continues in order to reduce uncertainties and learn more about possible options, a great deal has been learned and endorsed by the nations of the world. It seems to me that such a prominent textbook as yours should be presenting IPCC’s international process as an example of a way in which to approach dealing with very complex issues, even while your book might then go on to describe the contention that exists about how best to address this issue, whether locally, nationally or internationally. To instead present the climate change issue as an issue where the fundamental science is uncertain, an impression promoted by special interests in order to fuzz the public view as one step in slowing policy action, seems to me to do a real disservice to what all the nations of the world, including the US, have worked to accomplish over the past 20 years.

Severin Suzuki Addresses the Rio Earth Summit

When they were nine years old, Severin Suzuki and a group of fifth graders started the Environmental Children's Organization in Vancouver, Canada. They raised money to attend the 1992 Rio Earth Summit sponsored by the United Nations Conference on Environment and Development. When Severin spoke at the summit she was twelve years old. Her statement is available at <https://4tgc.civicspaceondemand.org/node/51>. It can be viewed at <http://www.youtube.com/watch?v=5JvVf1piHXg>. Severin continues to be an environmental activist.

Hello, I'm Severin Suzuki, speaking for ECO, the Environmental Children's Organization. We are a group of four twelve and thirteen year-olds from Canada trying to make a difference. We raised all the money ourselves to come 6,000 miles to tell you adults that you must change your ways. Coming here today I have no hidden agenda. I'm fighting for my future. I am here to speak for all future generations yet to come. I am here to speak on behalf of the starving children around the world whose cries go unheard. I am here to speak for the countless animals dying across this planet because they have nowhere left to go.

I am afraid to go out in the sun now because of the holes in the ozone. I am afraid to breathe the air because I don't know what chemicals are in it. I used to go fishing in Vancouver, my hometown, with my dad, until just a few years ago we found the fish full of cancers. And now we hear about animals and plants going extinct every day—vanishing forever. In my life, I have dreamt of seeing the great herds of wild animals, jungles, and rain forests full of birds and butterflies, but now I wonder if they will even exist for my children to see. Did you worry about these things when you were my age? All this is happening before our eyes, and yet we act as if we have all the time we want and all the solutions.

I'm only a child and I don't have all the solutions, but I want you to realize, neither do you! You don't know how to fix the holes in our ozone layer. You don't know how to bring the salmon back up a dead stream. You don't know how to bring back an animal now extinct. And you can't bring back the forests that once grew where there is now a desert. If you don't know how to fix it, please stop breaking it!

Here you may be delegates of your governments, business people, organizers, reporters, or politicians. But really you are mothers and fathers, sisters and brothers, aunts and uncles. And all of you are somebody's child. I'm only a child, yet I know we are all a part of a family, five billion strong, and in fact, thirty million species strong. Borders and governments will never change that.

I'm only a child, yet I know we are all in this together and should act as one single world toward one single goal. In my anger, I am not blind, and in my fear, I am not afraid to tell the world how I feel. In my country, we make so much waste. We buy and throw away, buy and throw away. And yet northern countries will not share with the needy. Even when we have more than enough, we are afraid to lose some of our wealth, afraid to let go. In Canada, we live the privileged life with plenty of food, water, and shelter. We have watches, bicycles, computers, and television sets. Two days ago here in Brazil, we were shocked when we spent time with some children living on the streets. And this is what one child told us: "I wish I was rich. If I were, I would give all the street children food, clothes, medicine, shelter, love, and affection." If this child on the street who has nothing is willing to share, why are we who have everything still so greedy? I can't stop thinking that these children are my own age. It makes a tremendous difference where you are born. I could be one of those children living in the favelas (shanty towns) of Rio. I could be a child starving in Somalia, a victim of war in the Middle East, or a beggar in India.

I'm only a child, yet I know if all the money spent on war was spent on ending poverty and finding environmental answers, what a wonderful place this Earth would be. At school, even in kindergarten, you teach us how to behave in the world. You teach us not to fight with others, to work things out, to respect others, to clean up our mess, not to hurt other creatures, to share, not be greedy. Then why do you go out and do the things you tell us not to do? Parents should be able to comfort their children by saying, "Everything's going to be all right. We're doing the best we can. It's not the end of the world." But I don't think you can say that to us anymore. Are we even on your list of priorities? My dad always says, "You are what you do, not what you say." Well, what you do makes me cry at night. You grown-ups say you love us. I challenge you, please, make your actions reflect your words. Thank you for listening.

Disappearing Glaciers Illustrate Climate Change in North America

by Alan and Judith Y. Singer



Glacier National Park is on the continental divide in the Rocky Mountains. It is actually an international park that straddles the border between Montana and Alberta, Canada. The year 2003 was one of the hottest recorded in Glacier National Park's history. That year, approximately 144,000 acres burned from multiple wildfires. If current trends continue, scientists predict that by the year 2030, there will be no more glaciers in Glacier National Park. – Photo of Lake Waterton by Alan Singer

For more information about Glacier National Park visit <http://www.nps.gov/glac/forteachers/index.htm>.



North of Banff in Alberta, Canada, Highway 93 runs through a field of glaciers. Visitors can walk out on the ice field or even take a special bus tour. This picture of Alan and Judi Singer on the ice field was taken in August 2001. Since 1897, the glacier has retreated about a mile and has lost about one-third of its volume of ice. Markings on trails leading to the glacier show how it has receded over the years. At the current rate, the glacier will completely disappear sometime in the next 300 years.

For more information about the Canadian Rockies Glacier field visit http://employees.oneonta.edu/baumanpr/geosat2/Big_Melt_Down/Big_Melt_Down.htm

Desertification of the Sahel

by Suzy Mellen

In recent years worry about global warming has drawn attention to human habits that are particularly vulnerable to climate change. The Sahel region of northern Africa, which has been plagued by desertification and famine, is an area of particular concern. A closer look at conditions in the region suggests that global warming is only one of a number of factors that have contributed to what may eventually become an environmental catastrophe of historical proportions. These include socio-economic and political developments as well as climate change.



The name Sahel comes from the Arabic word for “border.” The Sahel region marks the boundary between North Africa and Sub-Saharan Africa. It includes in whole or part of the countries of Senegal, Mauritania, Mali, Burkina Faso, Niger, Nigeria, Chad, Sudan, and the “Horn of Africa” nations of Ethiopia, Eritrea, Djibouti, and Somalia. Ethiopia, with a population of over sixty-eight million people is by far the most populous country. Sudan, with an area more than one-third the size of the United States, is the largest country. In general, population in the area is increasing rapidly, especially in urban areas. The countries of Chad and Sudan have recently been in the news because of civil wars that have generated large civilian casualties, refugees, and may involve genocide, especially in the Dafar region on the Sudan-Chad border.

Arid lands like the Sahel are defined by inadequate and seasonal rainfall, periodic droughts, an excess of evaporation and transpiration (loss of water by plants) over precipitation, limited or poor soil, and fragile ecosystems. While traditional farmers and nomads have been able to adapt to these environments, there is evidence that the introduction of inappropriate technology and land use practices have contributed greatly to irreversible desertification. While changes in the already arid climatic have created the potential for desertification, human actions have exacerbated and accelerated the process.

Part of the problem starts with rainfall fluctuations. During periods of higher rainfall, farmers expand production and utilize marginal lands. When rainfall inevitably declines during droughts, crops fail, cover vegetation dries up, and topsoil becomes vulnerable to wind and water erosion. Soil erosion, or degradation caused by the loss of nutrients, are very serious problems. Regions can rebound after droughts if there is a period of prolonged rainfall, such as what happened in the Sahel after the drought from 1968 to 1973. However, once topsoil is lost or degraded, even favorable rainfall cannot reverse the process.

The Sahelian drought that began in 1968 and ended in the early 1980s was responsible for the deaths of hundreds of thousands of people, the disruption of millions of lives, and the collapse of the agricultural bases of five countries.

Other human actions that contribute the desertification in the Sahel are over-grazing that destroys the vegetation cover and irrigation to promote commercial agriculture for export. Irrigation in hot, dry climates can cause the salinization of soil as water evaporates and leaves behind salt deposits that make agriculture impossible.

Social, economic and political forces contribute to desertification. Increasing population creates pressure for higher food production and the use of marginal lands and can lead to long-term deterioration and the expansion of deserts. Warfare, or simply migration to cities in the search of work, can lead to the loss of farmers with the most experience and knowledge about agricultural techniques suited to dry climates. This can also lead to environmental deterioration.

The introduction of new technologies can alter a balance between humans and the environment that had lasted for centuries. Rarely do technologies introduced into the dry lands coincide with the needs and skills of the society. They exploit marginal land to maximize profit and drive out the most skilled traditional farmers.

Governmental demands for increased productivity, often in response to pressure from multinational corporations and trans-national economic organizations, has led to overexploitation of the land and contributed to desertification. According to Samir Amin, former director of the United Nations Institute for Africa, famine in the West African section of the Sahel is not due to drought. "Drought has only revealed the seriousness of the situation, has aggravated it, but the desertification of the country by over-cultivating peanuts throughout a whole century has been and is the main responsibility for the deficiency in food agriculture today." Approximately one hundred years ago, most of the Sahel was controlled by French colonists and business interests. The French forced local farmers to grow peanuts for export to be used to produce vegetable oil for cooking. Peanut farming and processing by multinational corporations expanded rapidly after World War II. By the 1960s, peanuts were "King of the Sahel." A byproduct of the peanut industry was soil depletion in the region. Because peanuts grow underground, harvesting requires dislodging topsoil. Once loosened, the topsoil is blown away by dry seasonal winds. Small farmers, too poor to replenish the soil with fertilizer, grow peanuts until the soil is exhausted. They move on to new land, leaving barren land behind, and start the cycle of desertification in another fragile area.

One of the most important factors behind desertification and famine in the Sahel is global warming. As the oceans get warmer, storm power intensifies and established wind currents, rainfall patterns, and climate conditions are altered. The redirection of wind and rain causes profound flooding in some parts of the world and seems to be extending and intensifying periods of drought in the Sahel. The warming process also sucks more moisture out of soil and plants through evaporation and transpiration, and causing further desiccation. Even when there is rain in dry regions, it has become increasingly unpredictable, making it difficult for farmers.

Fifty-three percent of the two million children who die every year in the Sahel do so from malnutrition-related problems.

Students need to understand that human action and inaction, by local farmers, governments, multinational agribusinesses, international agencies, and the industrial superpowers, have each contributed to desertification in the Sahel region. While geographic changes are natural processes, they are greatly affected by what people do. Students also need to understand how local people and regions are affected by powerful social, economic, and political forces that are beyond their control. One goal in studying about the Sahel should be to spur student activism in support of people who are victimized by global change and to demand government and international action to combat both global warming and economic exploitation.

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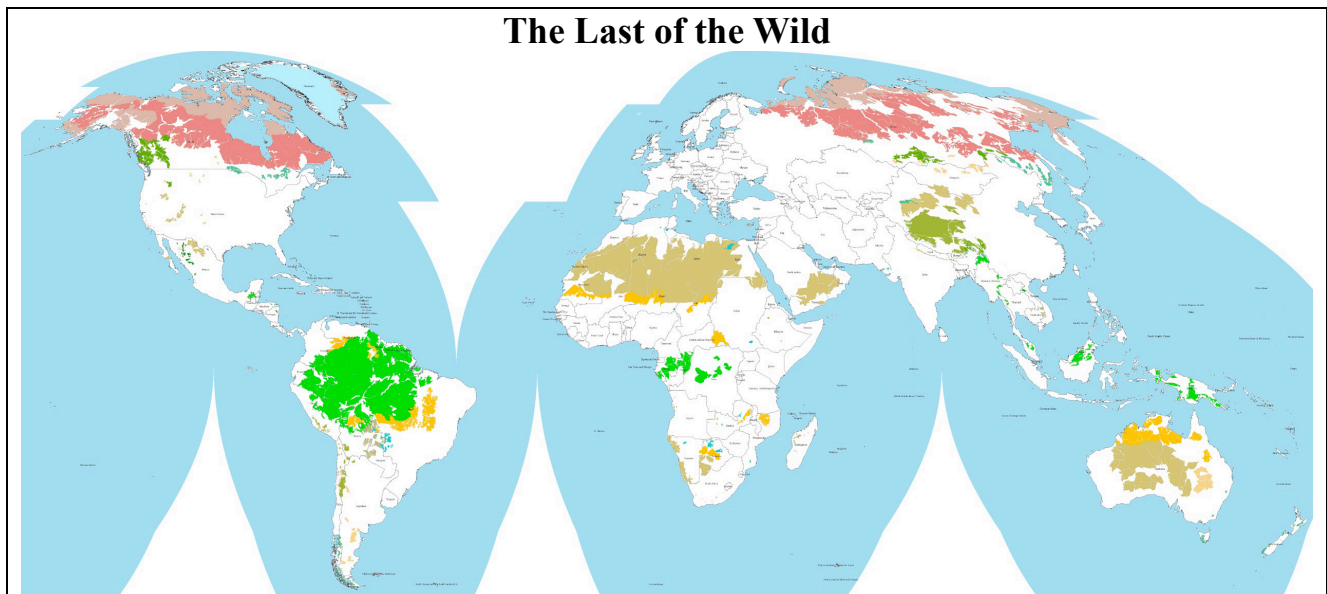
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The Human Footprint and the Last of the Wild

This work is the result of a collaboration between the Wildlife Conservation Society (WCS) and the Center for International Earth Science Information Network (CIESIN) at Columbia University. They systematically map and measure the human influence on the earth's land surface. Sources: http://www.wcs.org/sw-high_tech_tools/landscapeecology/humanfootprint and http://www.ciesin.columbia.edu/wild_areas/.

The “human footprint” is a global driver of conservation crises on the planet. If we want to conserve wildlife and wild places and have a rich and beautiful environment for ourselves, we need to find ways to moderate the negative impacts of human influence, while enhancing the positive impacts. Part of the solution is conserving the Last of the Wild – those few places, relatively less influenced, by human beings, in all ecosystems around the globe. Part of the solution is becoming better stewards of Nature across the gradient of human influence through conservation science and action. But the most important part of the solution is for human beings, as individuals, institutions and governments, to choose to moderate their influence in return for a healthier relationship with the natural world.

Analysis of the “human footprint” indicates that 83% of earth's land surface is influenced by one or more of the following factors: human population density greater than 1 person per square kilometer, within 15 km of a road or major river, occupied by urban or agricultural land uses, within 2 km of a settlement or a railway, and/or producing enough light to be visible regularly to a satellite at night. 98% of the areas where it is possible to grow rice, wheat or maize are similarly influenced. However human influence is not inevitably negative impact – in fact conservation organizations, including the Wildlife Conservation Society, have shown remarkable solutions that allow people and wildlife to co-exist. Nature is often resilient if given half a chance. Human beings are in the position of offering or withholding that chance.



The “Last of the Wild” represent the largest, least influenced areas in all the biomes of the world in all the world's regions. They represent a practical starting place for long-term conservation, places where the full range of nature may still exist with a minimum of conflict with existing human structures. The Wildlife Conservation Society works to save wild life and wild lands all over the world, while inspiring people to care about and understand nature through the largest system of urban wildlife parks in New York City. The Wildlife Conservation Society is committed to conserving wildlife and wild places by working on all fronts through its international conservation programs, living institutions, and pioneering environmental education programs.

The Nuclear Power Controversy

by Alan Shapiro

This article was adapted from material developed for TeachableMoment.Org, a project of Morningside Center for Teaching Social Responsibility (<http://www.teachablemoment.org/high/chernobyl.html>).

On April 25, 1986, explosions at a nuclear power plant in Chernobyl in the Ukraine sent a fireball of radioactive fission products and debris into the air. According to the World Health Organization, the explosions released 200 times more radioactivity than the atomic bombs at Hiroshima and Nagasaki. The terrible events at Chernobyl dramatized beyond any words the potential dangers of nuclear power plants and continue to affect discussions about their future. Some nations, for example, Germany, Sweden and Belgium, now have laws requiring the phase-out of such plants. Many others, among them France, Britain and Switzerland are committed to a nuclear future. In the United States, no new nuclear facility has been put on line for more than 30 years. Although the Bush administration supported nuclear power, proposals for new plants ran into strong local opposition.

The Case for Nuclear Power

U.S. Energy Secretary Samuel Bodman described the Bush administration's vision of "a world in which all responsible nations work together to share the benefits of peaceful nuclear power. We can provide vast quantities of affordable electricity, increase energy diversity, promote economic development, reduce pollution and carbon emissions, curb nuclear wastes and significantly reduce the risk of more terrorism. Even if we were to suddenly discover massive new reserves of oil within the territory of the United States which allowed us to eliminate all our oil imports, we would still have to deal with the pollution and greenhouse gases emitted by burning fossil fuels, not to mention the pollution caused by other nations" (www.energy.gov, 2/13/06).

C. Pierre Zaleski of the University of Paris, in his defense of nuclear power, argued, "there is a large potential for the development of nuclear energy," especially because of "the geopolitical risk connected with the supply of oil and gas, as well as the increased perception of finite fossil fuel resources and the detrimental effects of greenhouse gases" (www.npec-web.org (2/05)).

Faculty at M.I.T. described nuclear power as "an important option for the United States and the world to meet future energy needs without emitting carbon dioxide and other atmospheric pollutants." The group did recognize four problems: "high relative costs, perceived adverse safety, environmental and health effects; potential security risks stemming from proliferation; and unresolved challenges in long term management of nuclear wastes." (web.mit.edu/nuclearpower, 2003)

Duke Power has applied to build its first new nuclear plant in more than 30 years outside Gaffney, South Carolina and expect to have the plant online around 2015. According to a local politician, "The financial impact here will be phenomenal. Right now, downtown's pretty much dead. I think people are just pretty much comfortable with nuclear power in this part of the country." The promise of 1,500 jobs to construct the plant and another 1,000 to run it, along with millions in annual tax revenues to be split between the county and the state, are creating enthusiasm for the project. But the Blue Ridge Environmental Defense League said it intended to oppose it (*New York Times*, 4/10/06).

The Case Against Nuclear Power

Controversy over relying on nuclear power plants for energy began at least 30 years before Chernobyl. The most dramatic early event occurred at Sellafield, United Kingdom on October 10, 1957. A fire started at a reactor pile where plutonium was generated for Britain's nuclear weapons program. It burned for many hours and sent a radioactive cloud across Europe to Switzerland. In the Sellafield area thousands of liters of contaminated milk were dumped.

In March 1979 technical failures and human error led to a partial meltdown at the Three Mile Island nuclear power plant in Pennsylvania. Radioactive gases were released, and several thousand children and pregnant women were evacuated.

Opposition to nuclear power is strong among environmental groups. The Natural Resources Defense Council says, "Our overarching goal is the reduction, and ultimate elimination, of unacceptable risks to people and the environment from the exploitation of

nuclear energy for both military and peaceful purposes.” It called the Bush administration’s “vision” to extract and recycle spent nuclear fuel to be “unaffordable, uneconomical, unrealistic, unreliable, and unsafe” (www.nrdc.org).

Greenpeace believes safe reactors are a myth. An accident can occur in any nuclear reactor, causing the release of large quantities of deadly fission products into the environment. “One of the biggest problems facing the nuclear industry is what to do with the radioactive waste generated in a nuclear reactor. Large quantities of low and intermediate level wastes in liquid or solid form require a disposal route, and the highly radioactive spent fuel rods have to be isolated from the biosphere for hundreds of thousands, sometimes millions of years. The nuclear industry has had almost 50 years to find a solution to the nuclear waste problem and has failed to do so” (www.greenpeace.org).

Public acceptance of new nuclear reactors depends upon how people view the performance of old ones. Recently, some of the old reactors have been leaking radioactive water into the ground. Near Braceville, Illinois, an Exelon Corporation generating station leaked tritium into underground water that entered the well of a nearby family. Tritium is a form of hydrogen and emits a radioactive particle. Exelon has found similar leaks at two of its other Illinois stations.

At the Indian Point 2 reactor in Buchanan, NY, workers found wet dirt near the plant’s spent fuel pool, an indication that the pool was leaking. The tritium is slowly moving toward the nearby Hudson River. Indian Point officials say the quantities are very small and within the amount Indian Point is legally allowed to release into the river (*New York Times*, 3/17/06).

But Indian Point’s three reactors have long been a target of environmental groups, especially because it is just 24 miles north of New York City and 50 million people live within what is called the “peak injury” zone. Riverkeeper, an advocacy organization that monitors the Hudson River’s ecosystem, said, “Due to the plant’s vulnerability to a terrorist attack, a laundry list of safety problems, the storage of 1,500 tons of radioactive waste on site and the lack of a workable evacuation plan, Riverkeeper calls for the permanent closure of the Indian Point nuclear power plant” (www.riverkeeper.org).

Opponents of nuclear power emphasize that the enrichment of uranium (a necessary step in operating a nuclear reactor) can also lead to the creation of nuclear bombs. A major international controversy erupted over Iran’s nuclear program and its announcement that it was enriching uranium. Iran maintained it was interested in nuclear power to satisfy its energy needs, not to create weapons. But the U.S. and the European Union regarded Iran’s behavior as untrustworthy.

Len Ackland, editor of the *Bulletin of Atomic Scientists* at the time of Chernobyl, wrote, “There is the intimate connection between nuclear energy and nuclear weapons proliferation, and we have yet to overcome the problem of the susceptibility of complex systems to human error. Chernobyl remains the symbol of these dark sides of nuclear power” (www.thebulletin.org, March/April 2006).

Group Discussion

Divide the class into groups of four to six students to discuss the following two questions: What is the strongest argument for nuclear power? What is the strongest argument against nuclear power? Have each group begin with a go-around that gives every student a chance to respond to each of the questions. Then move to general discussion. Finally, ask students to decide, by consensus if possible, which argument is strongest. A reporter from each group can share the group’s decisions with the whole class.

Class Discussion

1. What questions do students have about the reading? How might they be answered?
2. Why are nuclear plants considered terrorist targets?
3. Why is nuclear waste regarded as a serious problem?
4. What is the connection between nuclear energy and nuclear weapons proliferation?

Further Inquiry

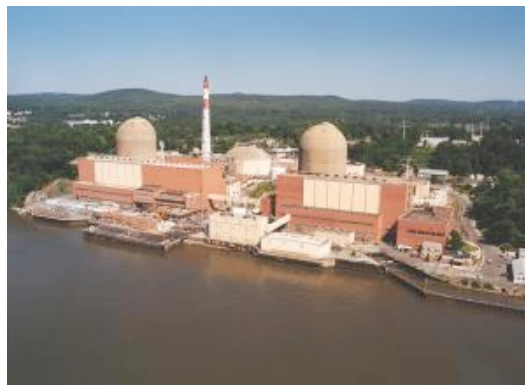
1. Why has Germany decided to phase out nuclear energy but Britain hasn’t?
2. Why have groups called for the shutdown of the Indian Point nuclear power plant? What successes, if any, have they had?
3. Why are the Iranian and North Korean nuclear programs regarded as a serious problem?
4. Investigate the effects of the Chernobyl meltdown, including its effect on children, the environment, and on the economy of Ukraine and Belarus.

The Indian Point Nuclear Power Plants - A History of Problems

Source: http://riverkeeper.org/campaign.php/indian_point/the_facts/1334

Examine this timeline of problems related to the Indian Point nuclear power plant located on the Hudson River in northern Westchester County, just north of New York City. After reading and discussing the timeline and conducting further research, students should prepare position papers on whether the plant should be relicensed or shut down. Position papers can be sent to Riverkeepers, an advocacy group that demands the shutdown of the plant, local newspapers, or elected officials.

Entergy Nuclear Northeast, the company that operates Indian Point, submitted an application to relicense the nuclear reactors on April 30, 2007. There are three nuclear reactors onsite: Indian Point 1 was semi-decommissioned in 1974 because it lacked emergency backup cooling systems; Indian Point 2, the most accident-prone of all the reactors, has had safety problems throughout its thirty years of operation; Indian Point 3, considered the “best” of the three, is now showing grave signs of aging with emergency shutdowns escalating. Indian Point has an emergency shutdown rate 5-6 times higher than any of the 103 other nuclear reactors in the United States. As the plants continue to age, experts warn that safety problems will not only increase, but increase in their severity.



Indian Point Nuclear Power Plants – Timeline

- 1954: Con Edison purchases Indian Point Park and neighboring land in northern Westchester County.
- 1963: Indian Point 1 starts operation.
- 1973: Indian Point 2 starts operation. Indian Point 1 is temporarily shut when a steam leak weakens safety devices.
- 1974: Indian Point 1 is ordered shut because it lacks an emergency cooling system.
- 1975: New York Power Authority purchases Indian Point 3, which starts operation in 1976.
- 1980: 100,000 gallons of radioactive water spills in the containment building of Indian Point 2.
- 1993: New York Power Authority closes Indian Point 3 because of a series of violations. It is placed on the federal Nuclear Regulatory Commission (NRC) “Watch List” for troubled power plants.
- 1994: Con Edison admits radioactive water has been leaking from the site for four years.
- 1995: Indian Point 3 restarts after a two-and-a-half year shut down. It is shut down again in 1998.
- 1997: Indian Point 2 is temporarily closed.
- 2000: Full scale alert at Indian Point 2, which is closed again. NRC rates it the most trouble-plagued nuclear power plant in the United States.
- 2000-2001: Entergy, an energy conglomerate based in New Orleans purchases all three power plants.
- 2002: Westchester County distributes potassium iodine pills to the public in case of a radioactive leak. Indian Point 2 is closed again.
- 2003: An independent study shows that the state evacuation plan for the region in the event of an emergency at Indian Point cannot protect the public. County officials refuse to sign the proposed plan. FEMA refuses to certify the plan. Because of mechanical failures, Indian Point 1 and 2 are temporarily taken off-line.
- 2004: The 9/11 Commission announced that nuclear power plants are being targeted by al-Qaeda. Riverkeepers claims that in a terrorist attack on Indian Point, 44,000 people would die from radiation poisoning and over 500,000 people would be at risk of cancer from radioactive exposure.
- 2005: Congresswoman Nita Lowey of Westchester introduces a bill to raise safety standards at older nuclear power plants. New radioactive leaks found at Indian Point 1, 2, and 3.
- 2007: Fish tested from the Hudson River near Indian Point have high levels of radioactive strontium-90, which can cause cancer. A new emergency siren system fails its final test.
- 2008: New York State joins legal effort to block the renewal of Indian Point’s operating license.

Debate Over Biofuels - Are They the Answer?

by Rena Drezner

Biofuels manufactured from solid waste, corn, switch grass, soybeans, sugar cane, rapeseed, algae, and other forms of organic material, have been proposed as a solution to the three main problems posed by fossil fuels (carbon-based oil, natural gas, and coal). Fossil fuels are non-renewable, while there is an endless, renewable, supply of biomass that can be converted into biofuels. Petroleum supplies are fast diminishing and existing supplies are located in regions of the world that are hostile to the U.S. Carbon-based fuels are responsible for global warming while biofuels may be more climate-friendly. Many scientists, however, have questioned whether biofuels will be the panacea the industrialized world is looking for.

The use of biofuels is not a new idea. Henry Ford planned to use biofuel to operate his cars and the diesel engine was designed to run on peanut oil. Bio-diesel fuel has been used in Europe and in the U.S. since at least 1999. It is a clean burning alternative fuel produced from renewable resources (fats) and contains no petroleum. According to the U.S. Department of Energy and Department of Agriculture, bio-diesel carbon dioxide emissions account for less than half of the emissions from petroleum diesel. Petroleum-based diesel, when it is blended with bio-diesel, burns more completely and produces less air pollution.

In the United States, most public attention is focused on a form of bio-alcohol known as ethanol. It is produced through the process of fermentation that converts sugars into alcohol. The same process is used to make alcoholic beverages. As dieters know, sugars are a form of carbohydrates. Any foods that are made of carbohydrates can be used to make ethanol. There is also ongoing research and development into the use of municipal solid wastes to produce ethanol. Currently, most Americans are using a mixture of ethanol (15%) and gasoline (85%) to fuel their cars.

There are many benefits to using ethanol. Since the mid-1970s, Brazil has had a biofuel program that uses sugarcane to make alcohol for cars, trucks, and planes, instead of just rum for drinking. This has meant increased employment in fields and factories, refineries that can generate their own heat and electricity by burning sugarcane waste, and wastewater from the process providing fertilizer to grow new crops. The vehicles used in the manufacture and transport of

sugarcane-based ethanol are all fueled by their own product. The Brazilian government claims that the domestic production of ethanol has improved air quality and saved money that would have been spent buying foreign oil.

Scientific studies comparing the energy used to produce sugarcane-based ethanol with the energy produced by the ethanol report that the energy output is much higher than the input. Using sugarcane-based ethanol can reduce the use of petroleum by as much as ninety-five percent and greenhouse gas emissions by approximately thirteen percent.

Despite these hopeful signs, many scientists are concerned that the costs of ethanol may outweigh its benefits, especially in temperate climate zones where corn must be used instead of sugarcane. Problems include a net loss of energy (it takes more energy to produce the ethanol than it provides), insufficient land to grow enough of the fuel crop, the use of petrochemicals in fertilizers and insecticides, rising food prices and food shortages as crops are diverted from food to fuel production, and a larger carbon footprint. The net loss of energy is caused by the amount of fossil fuel energy needed to produce, dry, transport, and store the corn, and the costs of conversion, transport and storage of the liquid fuel. In addition, the distillation or fermentation process releases carbon dioxide into the atmosphere. Even the most optimistic energy use projections are laden with problems. The ethanol needed to replace only the petroleum currently used by the United States would require three-quarters of all the cultivated land on the face of the Earth.

Intensive production of crops to produce ethanol depletes soil of nutrients and requires a copious amount of fertilizer to compensate for the loss. This will increase greenhouse gases emitted into the atmosphere and pollute ground water. Extending crop production into areas that are now forested will also interfere with the absorption of atmospheric carbon dioxide. Diverting crops from food to fuel production will threaten the world's poor with hunger and even starvation. Many countries are already vulnerable because of droughts and rapidly increasing populations.

The grain required to produce enough ethanol to fill the tank of a sport utility vehicle one time could feed a person for a year. During the first six months of 2008, there were food riots in Mexico City, Haiti, Pakistan, Cameroon, Egypt, and Indonesia. According to an article in *Discover* magazine (Barone, 2008), by 2016, an estimated forty-three percent of U.S. soil will be used to harvest corn for ethanol, which will drive up the cost of food staples in the United States and around the world.

Perhaps the gravest problem with corn-based biofuels, given the global warming crisis, is the carbon footprint it leaves behind. By some estimates, corn bio-diesel may produce up to fifty percent more greenhouse gases than fossil fuels (<http://www.foxnews.com/story/0,2933,297681,00.html>). The purpose of ethanol is to cut down on fossil fuel use but it is still necessary in the production of ethanol. The reason that biofuels have such a large carbon footprint is the same reason that there is a net loss of energy: production, drying and storage, transportation, conversion, transport and storage of liquid fuel. One must take into consideration how much greenhouse gases are released during the growing of the crop, transporting the crop to the factory, processing the crop, transporting the crop to the point of use, and the use in a car or bus.

While industrial society and the higher standards of living it produces require that we find cleaner and cheaper alternatives to fossil fuels, biofuels may not provide the answer to our energy needs. More scientific research needs to be done before industry and government commit to this energy source.

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Emerging and Remerging Infections: A New Vocabulary for a Small World

by Dr. Sandra W. Moss, M.D

The World Health Organization (WHO) defines an emerging or re-emerging infectious disease as “one that has appeared in a population for the first time, or that may have existed previously but is rapidly increasing in incidence or geographic range.” In recent years, newly recognized diseases – as well as some old enemies – have become part of our everyday vocabulary. Contributing factors include rapid global travel, a global food supply, population shifts in response to natural and man-made disasters, urbanization and crowding, environmental upheavals which alter the habitats of disease carrying animals and insects, revolutions in sexual practices and intravenous drug abuse, and lapses or deterioration in public health systems. Medical researchers, clinicians, and public health officials respond with varying success to each new disease, adapting old strategies such as quarantine and developing new strategies for prevention and treatment. The web sites of the CDC (Centers for Disease Control) and WHO (World Health Organization) are reliable sources of up-to-date information.

West Nile virus: First recognized in 1937 in Uganda, West Nile virus spread to North America in 1999. Transmitted from many species of birds by the bite of a mosquito, the virus can cause a fatal form of encephalitis or meningitis. Since 1999, when 62 cases were recognized in New York, annual infections rose to 9,862 in 2003 and fell to 4,269 cases in 2007. As of January 1, 2006, there have been approximately 24,000 cases with 1000 deaths. There is no specific treatment aside from supportive therapy. Insect repellants and protective clothing help prevent infection.

Ebola virus: Ebola, named for a river in the Congo, is a highly fatal viral hemorrhagic fever. Its origins are unclear, although some early cases were identified in laboratory workers or animal handlers in close contact with primates. Researchers do not yet know the mechanism of viral transmission to the first case in a local outbreak, but it is likely that the disease is a transmitted from an infected animal to humans. Use of unsterilized needles in a medical facility was a factor in at least one epidemic. Transmission from human to human occurs through contact with blood or secretions. The first recognized cases occurred in Africa in 1967. To date, outbreaks have been localized in areas of Africa, striking quickly and then disappearing. Medical personnel have themselves become victims. International jet travel makes Ebola a worldwide threat because the disease has an incubation period of up to 21 days, during which an infected but unsuspecting person may be well enough to travel.

Hantavirus: In May 1993, healthy young adults of the Navaho tribe in the Four Corners area (the junction of Arizona, Colorado, New Mexico, and Utah) died of a mysterious respiratory illness. Laboratories quickly identified a previously unknown strain of Hantavirus. Epidemiological research, involving the trapping and testing of many rodent species, pointed to the deer mouse, a common pest in rural homes and workplaces such as sheep ranches. The presumed mode of transmission was by inhalation of animal excreta with no evidence of human-to-human transmission. Examination of stored tissue samples showed that the disease had been causing occasional deaths from pneumonia for many decades. Navaho lore includes a tradition of mouse-associated lung diseases. Hantavirus cases spiked in 1993 because recent rains following a lengthy drought resulted in a rapid increase in the deer mouse population. The primary means of prevention is rodent control. There is no effective treatment except for supportive measures.

Lyme disease: In 1976, a cluster of arthritis cases among children in Lyme, Connecticut, was shown to be caused by a bacterium named *Borrelia burgdorferi*. Similar, though not identical, cases had been identified earlier in Europe under different names. A characteristic bull's eye rash is an early sign of the disease, followed in a few weeks by arthritis symptoms with a variable incidence of neurological, cardiac, and other organ system manifestations. In some cases,

symptoms may be prolonged or recurrent for months or years. The bacterium is transmitted to man by the deer tick, and the appearance of the disease in the northeastern United States may be related to an increase in the deer population. Precautions against tick bites and removal of embedded ticks are the first line of defense. Antibiotics, taken for several weeks up to two months (depending on the stage of the disease) are almost always effective in curing the infection and preventing progressive symptoms. Like many diseases, both infectious and non-infectious in origin, Lyme disease has become politicized as a spectrum of lay and medical groups, sometimes at odds, struggle to define the disease, its treatment, and its impact on victims.

Legionnaires' disease: In 1976, an outbreak of severe pneumonia occurred in over 200 delegates to an American Legion convention in Philadelphia, with 34 fatalities. The causative organism was eventually identified as virulent strains of a newly recognized bacterium given the name *Legionella pneumophila*. Epidemiological investigations showed that *Legionella* is transmitted as an aerosol or droplets from warm water environments such as nebulizers and humidifiers as well as ventilation and plumbing systems. Monitoring of water-bearing ventilation systems and plumbing systems in institutions such as hospitals is now routine, although elimination of the organism from water supplies is costly and difficult. A number of outbreaks have occurred in hospitals as well as sporadic cases in many communities. Microbiological detective work showed retrospectively that *Legionella* had been responsible for a mysterious outbreak of non-fatal and self-limited flu-like illness in Michigan, decades earlier. Legionnaires' disease is now known to be a relatively common cause of pneumonia, especially in the elderly; it is diagnosed by routine blood and sputum tests and responds well to antibiotics.

Severe Acute Respiratory Syndrome (SARS): In 2003, a new acronym entered the American vocabulary. SARS is a respiratory infection caused by a previously unknown viral strain. The outbreak probably began in southern China and may have been transmitted to humans from an animal, possibly a civet, in a wild animal market. The often-fatal pneumonia quickly spread from China to two-dozen countries. In North America, Toronto was the hardest-hit city. Worldwide, over 8,000 people, including many health care workers, developed SARS and close to 800 died.

A massive public health effort involving isolation of cases, infection control measures such as masks and gloves, limited quarantines, and travel alerts and passenger screening ended the outbreak. SARS raised important questions for the health care system, including the problem of health care workers missing work because of perceived and real dangers to themselves and, more importantly, their families. Caring for the caregivers has continued to be a topic of interest to medical ethicists and health care planners.

Mad Cow disease: Mad cow disease or bovine spongiform encephalopathy (BSE) is a neuro-degenerative disease of cattle caused by an abnormal protein called a "prion." Scrapie, a prion disease of sheep, was probably transmitted to a few herds of cattle in the United Kingdom in the 1970s and 1980s through meal containing sheep by-products. In 1993, the disease was "amplified" by the widespread feeding of bovine by-products to calves, causing the infection to spread to some 35,000 herds. In the 1990s, the BSE prion was strongly implicated in a sudden increase in cases of a rare, progressive, untreatable, and fatal neurological disorder called variant Creutzfeldt Jakob disease. Muscle meat such as steak does not seem to transmit the disease, while ground meat and sausage that may contain spinal or brain tissue is considered far more likely to be involved in transmission. The British epidemic was controlled by export restrictions, feed guidelines, and the massive slaughter of cattle herds. To date, 15 infected animals have been found in North America; none entered the food chain. The U.S. Department of Agriculture has strict guidelines to protect the food supply from BSE.

Bird (Avian) flu: When we think of influenza pandemics, the model in the back of our minds is the pandemic of 1918-1919 that killed between 40,000,000 and 100,000,000 people worldwide, including some 500,000 in the United States. Researchers now believe that the 1918 strain, and influenza viruses in general, were transferred from birds to humans either in the remote past or, in some cases, more recently. Avian or bird flu is primarily an animal epidemic that has the capacity to spread to humans. Strains of influenza A virus (H5N1) found in poultry and wild birds, including migratory species, spread quickly through flocks. In a 1997 outbreak in Hong Kong, people who worked closely with poultry became ill from direct contact with the viruses. Some countries have culled

domestic flocks in which the disease is detected, a severe economic burden for small farmers and poultry dealers. Because humans have so little resistance to new avian strains, the possibility of a widespread and possibly highly fatal, pandemic exists. Vaccine production and the stockpiling of antiviral drugs are in the planning stages, but there are severe logistical problems. Person-to-person spread seems to be rare and is usually confined to family members of poultry workers. Unfortunately, influenza virus is known to mutate quickly and could result in strains much more likely to infect humans. Existing antiviral medications may not be effective against these new strains, and at present there is no vaccine. H5N1 strains have been recovered from pigs, cats, and dogs. To date, there have been less than 400 confirmed cases in humans (particularly in Indonesia and Thailand) with a death rate of about 60%. The risk at present remains highest among poultry handlers and processors; properly cooked chicken does not seem to pose a risk.

“Man-Made” Diseases

Some familiar diseases once thought to be under control have forced us to look at antibiotics in a new way. Health officials and practitioners have been aware of the problems of antibiotic resistance for decades, but the idea of a “miracle drug” or a “magic bullet” persists. For example, in the effort to control malaria, health officials face two resistance problems: pesticide resistance among malaria-carrying mosquitoes and anti-malarial drug resistance in the disease-causing parasite. As many as 500 million people contract malaria annually, and there are over a million deaths. Many are young African children. Although the United States is currently malaria-free, American travelers who do not receive effective prophylactic medication are also at risk.

Development of antibiotic resistant bacteria is also a serious problem in developed countries. Resistance develops most rapidly in hospitals, where the newest, toughest drugs are used to treat the most life-threatening infections. In outpatient practice, widespread use of newer antibiotics for the treatment of diseases that require either a simpler, older antibiotic or no antibiotic (e.g., a viral respiratory infection) has contributed to the problem of antibiotic resistance. Several mechanisms are at work in these situations. Microbes (bacteria, viruses, fungi, parasites) evolve fairly rapidly in their own struggle for survival. For example, when penicillin was introduced in the 1940s,

a bacterium called *Staphylococcus aureus* was easily killed. At the time, the action of penicillin seemed miraculous. The small minority of staphylococci that were resistant to penicillin had an obvious survival advantage and within two decades most staphylococci were resistant to penicillin. To treat penicillin-resistant staphylococci, pharmaceutical researchers developed methicillin and related derivatives of penicillin. Today, methicillin-resistant *Staphylococcus aureus* (MRSA) has become a serious problem.

Failures of Immunity

Antimicrobial drugs (loosely referred to as antibiotics) can only do so much. The normal defense mechanisms of the human host – a complex immune system that is the subject of much research – work alone or in concert with antibiotics to quickly control many potential threats. For example, many people who are exposed to *Mycobacterium tuberculosis*, the causative agent of tuberculosis, are able to “wall off” and destroy the organisms without ever becoming ill. Most Americans with a “positive” PPD skin test for tuberculosis have normal chest X-rays and will never become sick. Doctors treat such individuals, particularly young people, with anti-tuberculosis therapy because of the fear that the walled-off bacteria might reactivate later in the patient’s life, perhaps when his immune system is less hearty. The immune system can be compromised in many ways. A few people are born with immune deficiencies. More commonly, diseases such as cancer or AIDS cripple the immune system, leaving the patient open to a reactivation of dormant tuberculosis or the onset of severe infections with usually harmless organisms such as the parasite *Pneumocystis carinii* or the fungus *Candida albicans*. Poverty, malnutrition, and crowding give an additional edge to infections like tuberculosis. Viruses such as influenza are most often fatal in frail elderly, people with chronic diseases such as diabetes, and the very young – situations in which the immune system is less robust.

Advances in medicine have paradoxically opened the door to infectious diseases that were once rarities or easily controlled. For example, cancer chemotherapy, an array of treatments that has saved or prolonged millions of lives, often weakens the immune system. Organ transplant recipients must take immunosuppressive drugs to prevent rejection of the transplant. Researchers and practitioners have tried to meet these challenges by finding ways to build up the immune

system as well as developing better antimicrobial drugs. Many chemotherapy patients now receive drugs to raise the level of germ-fighting white blood cells.

In 1981, a sudden increase in rare lung and skin infections usually seen in immune-suppressed individuals began to appear in previously healthy male homosexuals, recipients of multiple blood transfusions (such as hemophiliacs), and intravenous drug users. The symptom complex came to be referred to as the acquired immune deficiency syndrome or AIDS). A retrovirus, now called human immunodeficiency virus (HIV-1 and HIV-2), was isolated in 1983 and blood tests for the AIDS virus were developed in 1985. Retrospective blood testing suggests that the disease may have appeared in man as early as 1959. Scientists now think that SIV (simian immune virus of chimpanzees) and similar viruses jumped from primates to man. Today, the success of antiretroviral therapy in developed countries has created a new dilemma for medicine: long-term survivors of the early years of the epidemic face the diseases of aging with immune systems that may have been damaged in the years before effective treatment was available. Students and many young educators do not remember a world without AIDS.

Bioterrorism

Bioterrorism has driven us back to the history books; the very threat of smallpox in the hands of terrorists has shattered our complacency. In 1979, almost 200 years after Edward Jenner introduced the cowpox vaccination, the WHO declared smallpox officially eradicated. The last natural case of smallpox occurred in Somalia in 1977 and a final case of laboratory-acquired smallpox occurred in England in 1978 – the last of uncounted hundreds of millions of deaths caused by this dreaded viral scourge. Among its victims were hundreds of thousands – perhaps millions – of Native Americans who had no natural immunity against the virus transported to the New World by European explorers and settlers. Smallpox and other European diseases such as measles and influenza raced from village to village, devastating ancient American cultures.

Today, childhood smallpox vaccination is no longer required. Middle-aged readers of this article may still carry the telltale vaccination scar, a coin-like depression on the upper arm. Protected repositories of smallpox are maintained in Russia and in the United States for future research on treatment and prevention,

a decision that has led to much debate about the security of the repositories. Smallpox is listed as a class A bio-terrorism agent by the CDC, along with anthrax, botulism, bubonic plague (the pneumonic type, spread by respiratory secretions), and a group of hemorrhagic fevers.

Anthrax is a bacterial infection usually confined to workers or hunters who handle infected hides or animal products. Typically, a black skin ulcer heralds the disease in humans. In this type of anthrax, human-to-human spread is rare, and the disease is treatable with antibiotics. Inhalation of anthrax spores, however, can result in pneumonia with high mortality and rapid spread among human victims. In 2001, bioterrorists used this type of anthrax distributed through the U.S. mails to infect 22 people, causing five deaths.

Cost of Complacency

Complacency can be a factor in the reemergence of old scourges. Polio, for example, remains a threat despite the availability of effective vaccines for over half a century; a small outbreak among non-immunized children occurred in Minnesota in 2005. In the mid-nineteenth century, over 100,000 children died of diphtheria annually in New York City, a pattern that continued to the end of the century. Few people are alive today who remember the terrors of childhood diphtheria that, in its most malignant form, closes off the upper airway and leads to death by suffocation. When a critical number of children and adults have no immunity to a disease such as diphtheria, the potential exists for rapid spread. In the United States, respiratory diphtheria has not been reported since 1996. However, in the early 1990s, widespread diphtheria epidemics (150,000 cases) occurred in adults and children in the newly independent states of the former Soviet Union. Mortality was higher than 20% in the worst affected areas. Despite universal childhood immunization recommendations, many children in the United States and other developed countries do not receive a full course of vaccinations as recommended by medical authorities and often enforced by school systems. For a growing number of diseases, adult immunizations and boosters are strongly recommended and often underutilized.

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Famine: The Black Horseman of the Apocalypse

by Meryl Landau

In the Biblical *Book of Revelation*, there are four fearsome horsemen that represent war, famine, pestilence, and death. Famine rides on a black horse. Famine, which has regularly plagued human societies since ancient times, continued to be a recurring problem in the twentieth century despite economic and political development. The ability to prevent future famines rests on understanding why they occur. The key issue is whether they should be viewed as natural phenomenon or as human-induced disasters.

Commenting on the Great Irish Famine of the mid-nineteenth century, John Mitchel called it an “artificial famine.” Great Britain blamed it on a blight or fungus that decimated the potato crop, an act of nature beyond the responsibility of people and governments. Mitchel pointed out that the potato crop had failed across Europe, but only produced famine in Ireland. He blamed “official red tape” and “the principles of political economy.” According to Mitchel, “The Almighty sent the potato blight, but the English created the famine” (Gallagher, 1982).



THE FAMINE IN IRELAND.—FUNERAL AT SKIBBEREEN.—FROM A SKETCH BY MR. H. SMITH, CORK.

The Illustrated London News, January 30, 1847

Similarly, twentieth century famines in Bangladesh (1943), China (1958-1962), and in the Ukraine (1932-33) were precipitated by natural conditions, but became famines as a result of government action or inaction. Nobel prize winning economist Amartya Sen argues that as in Ireland, natural disasters in these regions became human catastrophes because of governments that did not represent the afflicted

populations. According to Sen, “No substantial famine has ever occurred in any independent and democratic country, with a relatively free press” (Sen, 1999). He argues that leaders of dictatorial communist regimes in China and the Ukraine knew about hunger in their countries but decided to use it as political weapons, believing that recalcitrant peasants were hoarding grain. In Bangladesh, British colonial authorities used existing food supplies to support troops during World War II rather than civilian populations.

The death toll from the 1932-33 Ukrainian famine has been estimated at between six million and seven million people. In the 1930s, the Ukraine was part of the Soviet Union. In 1929 the Communist Party and Soviet government led by Joseph Stalin began to implement a Five-Year Plan to simulate intensive economic growth with a particular emphasis on heavy industry. The economy was centralized: small-scale industry and services were nationalized, managers strove to fulfill output quotas, and the trade unions were converted into mechanisms for increasing worker productivity. To satisfy the state’s need for increased food supplies, the First Five-Year Plan called for the organization of the peasantry into collective state run farms. Movement by the peasants was restricted. In essence, they were bound to their land like medieval serfs. Farmers were told that these actions were for the general good and if they failed to comply they would be punished for committing treason.

According to an eyewitness, “The winter of 1932-33 was different from any previous ones. The scarcity of food alarmed us early in November while we were still working in the fields of the collective farms. The small advance from the kolhosp (government) had already been consumed. We had been told by soldiers that we would receive more food as soon as the field work was completed. But we never did.” In addition, the government imposed production and export quotas that were impossible to meet. “Farmers without livestock were forced to pay this obligation to the state with money. Thus, the annual earnings of a collective farmer from his work on the collective farm were

insufficient to meet his obligations to the state, let alone for his subsistence” (Dolot, *Execution By Hunger*, p. 173).

Local government officials urgently appealed to Moscow for a reduction in the export quotas. Stalin responded by denouncing them and rushed in over 100,000 soldiers to purge the Ukrainian local government officials. The Soviets then sealed off the borders of the Ukraine, preventing any food from entering. Soviet police inside the Ukraine went house-to-house seizing stored food. Food was considered property of the State, anyone caught “stealing” State property could be shot or imprisoned for not less than ten years.

The famine in China from 1958-62 was the result of government policy and an inadequate transportation network that made it difficult to get food to the affected part of the country. The Chinese Communist Party, led by Mao Zedong, prevailed in a civil war in part because they won support from peasants by promising equitable land redistribution and an end to hunger. However, Mao greatly admired Joseph Stalin’s Five-Year Plan and attempted to implement a similar program in China. In 1956, China started collectivizing farms and restricted the ability of peasants to seek work outside of their villages. During the winter of 1958, it became apparent that there would not be sufficient grain in the rural areas for the following year. Mao blamed hoarding by peasants for the problem, refused to abandon collectivization, and refused to distribute food stored in state-controlled granaries. By the winter of 1959, the young and elderly began to die from starvation, and by the spring of 1960 as many as twenty-five million people may have died of starvation (Becker, 85).

The Bengali famine of 1943 was another major famine caused by an autocratic government that would not respond to the needs of the affected population. Bangladesh was part of the British colonial holdings on the Indian sub-continent. With the outbreak of World War II, British authorities were concerned about a possible Japanese invasion of India. Emergency measures were introduced to stockpile food for British soldiers at bases in other areas and to eliminate food supplies available on the sub-continent to a potential invading army. Large amounts of rice were exported to the Middle East and a “scorched earth policy” was

started in the Chittagong region near the Burmese border to limit agricultural production.

In October 1942 the east coast of Bengal was hit by a massive cyclone that flooded rice producing regions. The fall crop was destroyed; the population soon exhausted existing food reserves, and even ate seeds that were supposed to be planted to produce a new crop. The “scorched earth policy” and the cyclone both caused shortages and food prices to rise. The famine was the result of a British decision not to respond with aid (Chowdhury, 24) and the extreme poverty of the Bengali masses who could not purchase available food at the higher prices .



Famine in Bengal by Zainul Abedin (1943)

As each of these cases makes clear, hunger in the twentieth century was the result of war, natural disasters, and crop failure. Famine, on the other hand, was caused by the failure of undemocratic regimes to respond to the needs of distressed populations.

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First-Hand Accounts of Famine

Read the three first-hand accounts of famine in China, Ukraine, and Ireland. What do the accounts have in common? How are they different? What makes the accounts so horrific? Do research on famine in the world today. Write a poem, song, rap, or speech designed to convince people to support famine relief.

A. Famine in China, 1959-1960 (Source: www.enonline.net/fex/08/ms20.html):

“On the muddy path leading from her village, dozens of corpses lay unburied. In the barren fields there were others; and amongst the dead, the survivors crawled slowly on their hands and knees searching for wild grass seeds to eat. In the ponds and ditches people squatted in the mud hunting for frogs and trying to gather weeds. It was winter, and bitterly cold, but . . . everyone was dressed only in thin and filthy rags tied together with bits of grass and stuffed with straw . . . Sometimes she saw her neighbors and relatives simply fall down as they shuffled through the village and die without a sound . . . The dead were left where they died because... no one had the strength to bury them . . . She remembered, too, the unnatural silence. The village oxen had died, the dogs had been eaten and the chickens and ducks had long ago been confiscated by the Communist Party in lieu of grain taxes. There were no birds left in the trees, and the trees themselves had been stripped of their leaves and bark. At night there was no longer even the scratching of rats and mice, for they too had been eaten or had starved to death.”

B. Famine in Ukraine, 1932-1933 (Source: www.ukrweekly.com/Archive/1983/278322.shtml):

“On the streets of Kiev I saw people who had come from the village’s in the hope that in the city they would be able to save their lives. The village women left me with a horrifying impression: they hadn’t even the strength to hold their dying children in their arms. A cold wind blew, and they sat immobile on the sidewalks, staring straight ahead. Perhaps they did not understand what was happening to them. Next to them lay the dying, or already dead children. I stopped near one of these women. She softly whispered: ‘God, help us. God, help us.’ She did not even have the strength to remain in a sitting position; she fell on the cobblestone street and fell silent. Shaken by this, I fled . . . I met a six-year-old boy who was sitting alone and was unsuccessfully begging for food with an outstretched hand. I took him to my flat on the third floor. He clung to me, as if to his own mother. We stole home carefully so that, God forbid; no one would see us, because it was forbidden to help, to take any of the starving into one’s own apartment. The poor child was frighteningly skinny and sick. I wanted very much to take care of him, but the circumstances of our lives absolutely did not permit us to do this: I came home very late; my husband, after his return from prison, was ill; and my mother also could not help because of an illness so grave that she could not even get out of bed. I fed him, gave him some food for the road, dressed him in my own jacket, which reached down to his heels, and with a heavy heart and tears in my eyes, I led him back to where I found him – the streets. I never saw him again. I saw corpses scattered on the streets of the cities. I saw dying children and mothers. I saw the famine that killed people like flies - and this in a country that was known for its fertile land and was once the breadbasket of Europe. This tragedy of the Ukrainian nation was premeditated and executed with precision.”

C. Famine in Ireland, 1845-1853 (Source: M. Murphy, ed., *Asenath Nicholson, Annals of the Famine in Ireland*. Dublin: Lilliput, 1998):

“Six men, beside Mr. Griffith, crossed with me in an open boat, and we landed, not buoyantly, upon the once pretty island. The first that called my attention was the death-like stillness – nothing of life was seen or heard, excepting occasionally a dog. These looked so unlike all others I had seen among the poor – I unwittingly said – ‘How can the dogs look so fat and shining here, where there is no food for the people?’ ‘Shall I tell her?’ said the pilot to Mr. Griffith, not supposing that I heard him. This was enough: if anything were wanting to make the horrors of famine complete, this supplied the deficiency.”

Combating Hunger in the World Today:

Lessons from the NYS Great Irish Famine Curriculum

One purpose of the New York State Great Irish Famine Curriculum was to raise awareness about the causes of worldwide hunger today. These materials on hunger in Africa are intended for middle level students in grades five to eight. The New York State Great Irish Famine Curriculum was edited by Maureen Murphy of Hofstra University. It is available on-line at <http://www.emsc.nysed.gov/nyssa/gif/index.html>.

A. Malnutrition and Famine

Malnutrition occurs when the human body receives less food than it needs to function properly. The average adult needs 2,400 calories per day. Anyone receiving a smaller amount is undernourished. The critical minimum limit is 1,600 calories per day. Below this minimum, there is little chance of survival. Those most at risk of malnutrition include the poor (especially the rural poor), slum dwellers and the landless, the elderly, women and children among the poor, refugees, and tribal people. Malnutrition is a creeping problem – people are slowly affected by a lack of adequate food over a long number of years

Famines occur when people cannot get the food they need to survive. Sometimes there is no food. Sometimes there is food, but people do not have the resources to purchase it. It results in a sharp increase in the number of deaths in a particular area. These deaths are caused by both disease and starvation. Famine is not an uncontrollable tragedy. In the modern world, famines are preventable.

B. Hodan's Story

1. Hodan lived with her husband, Gibreel and their three children near Baidoa in Somalia. She was extremely poor; she had no money and just a few farming tools. Her small plot of land was barely large enough to provide food for her family. If she were better off she could have bought more land but she had already sold some of her goats to survive. The few goats she had left provided the family with milk.
2. The land Hodan owned was poor in quality. Until a few years ago she had a larger piece of land but her neighbors who belonged to another clan took over some of her best land. Since then, each year she farmed the same piece of land and, as a result, the land became less and less fertile, producing less and less maize. Meanwhile, her neighbors were growing bananas and cotton and growing wealthier.
3. Hodan cooked the maize for her family on three stone stoves. Each day the children would gather firewood while the goats grazed on the vegetation nearby. Hodan knew cutting the trees was damaging the environment. When the rains came, she could see the soils being washed away, taking with it valuable nutrients. But Hodan had no choice.
4. The first year the rains failed, Hodan and her family survived on the maize they had stored from the previous harvest. The next time the rains failed, they had nothing stored because the harvest had been so poor. They survived by eating wild grasses, berries, leaves and roots. Gibreel went to work on their neighbors farm. Relatives gave them seed for the next year.
5. Hodan took her remaining goats to the market where she hoped to sell them to buy food for her family. Many of her neighbors were there. Everyone wanted to sell their animals. Most of the animals were already in poor condition because the grazing was so poor. Few people had money to spend. Because of this the price of goats had fallen and Hodan got very little money for her goats. To make matters worse, the price of food had risen. This was because food was scarce. Food was being imported from neighboring countries and this was very expensive.
6. Because of the shortage of food, Hodan's family's health was suffering. The youngest child became seriously ill with measles and the other children were suffering from malaria. Hodan could not afford the medicine they needed. She herself was becoming weaker and weaker and was finding it harder to work.

7. Somalia had a long history of war. Britain and Italy had taken control of Somalia at different times. Somalia had also been at war with Ethiopia. Clashes between clans were common. The President Siad Barre encouraged clan rivalry. When he fled to Kenya, Somalia was left with no President and no government and the violence continued. One day, Hodan's village was attacked. Her home and crops were destroyed, and she was left with nothing.

8. Hodan and her family left their village and walked for several days. Finally, they arrived at a refugee camp where some international Aid agencies were giving out food. Thousands of others had already flocked into the area. Hodan and her family were given shelter made out of plastic sheeting. There wasn't enough food, clean water or proper sanitation in the camp. The militia sometimes raided the camp for food. Some of the agencies ended up paying the militia for security. Hodan could see that this was actually keeping the factions in business for longer.

Questions

1. What is malnutrition?
2. What is a famine?
3. Why are Hodan and her family described as "poor"?
4. Why does Hodan's land produce less food each year?
5. How did Hodan and her family survive without rain?
6. How did the shortage of food affect Hodan and her family?
7. How did war make conditions in Somalia worse for Hodan and her family?

C. Famine Relief

Instructions: Divide the class into groups of four. Each group is assigned two or three famine relief projects that need funding. Their job is to prepare a proposal defending one plan. They will present this plan to a fictional relief agency. Their goal is to explain how their project addresses the problem of famine in Somalia. At the end of the presentations, the entire class serves as the Board of Directors of INTER-RELIEF. They only have a \$30,000 fund to spend. Ask them first to draw up a list of criteria for deciding which project applications they support. Students are then divided into new teams of four to six. Each team must decide which programs they will support and be able to explain the reasons for their selections.

Causes of Famine in Africa

A. Poverty. Of the 20 poorest countries of the world today, eighteen are Sub-Sahara Africa. Most of these countries have become poor in the last 30 years. Poor people are most at risk during food shortages because they have little in reserve to help them survive.

B. War. During 1945 and 1989 there were at least 30 major conflicts in Sub-Saharan Africa. In the 1990s there have been major conflicts in Somalia, Sudan, Mozambique, Liberia and Angola. War interferes with farmers so they grow less food. Animals and crops are destroyed. Money that should be spent on agriculture, health care and education is spent on buying arms and feeding armies.

C. Environmental Damage. The Saharan desert is growing. Trees are cut down for firewood and to make room for crops. In 1880, forty-four percent of Ethiopian land was covered by trees. Today it is only four percent. The roots of the trees hold water and prevent the soil from blowing away. If the soil is eroded, harvests are smaller. More than 10 million people have been forced to leave home in Africa as a result of desertification.

D. Poor Land. The best land in Africa is used for cash crops such as coffee. These crops are exported and most of the money earned goes to repay loans from foreign countries and banks. Small farmers are forced onto smaller farms on poorer land.

E. Drought. Drought is not the cause of famine, but it is often the trigger that leads to a disaster. Drought has been a feature of many African countries.

F. Debt. During the 1970s many African governments borrowed large sums of money when interest rates were low. Many of those who borrowed and benefited from the money have left office. Interest on these loans is very high. Food is sent overseas to pay off the debt while poor people go hungry and suffer from malnutrition.

Proposed Famine Relief Projects

1. We are a cooperative of 20 farmers. We work on irrigated plots of land and train farmers in the area on pest control and sustainable methods of agriculture. We need to buy tools and seeds to distribute to farmers who take part in this program. Cost: \$5,000
2. We are a group who provide wells for villages in the Southern region of Somalia. These wells provide water for vegetable gardens. The vegetables improve the diet of the villagers and allow them to have an income by selling any surplus in the local market. Three staff members need training on the assembly, installation and maintenance of pump systems. The course is being run in Mogadishu, the capital and will last three weeks. Cost: \$500
3. We are organizing an awareness-raising program around water and soil conservation issues and setting up mini-nurseries in villages. We provide farmers with saplings that they can plant. Our aim is to help farmers to improve the quality of their land. We need to buy materials to set up three mini nurseries. Cost: \$2,000
4. We are a community group concerned about the poor level of education in our area. We would like to rebuild a local school that was destroyed by the militia. We will build the walls of the school with local materials. We need funding for timber and iron sheeting for roofing, doors and window frames and to repair the furniture. Cost: \$1,000
5. We are a medical team responsible for running the mobile health clinic. The mobile clinic visits six sites on a weekly basis. We also run a health program for mothers of young children. We need to buy drugs and medical supplies. Cost: \$10,000
6. We are a group of Irish nuns working in Baidoa. We run a feeding center that provides food free of charge to the most needy people in the area. We work with the village elders and so keep food out of the hands of the warlords. We need to replace our distribution truck. Cost \$25,000
7. We are a group of Irish aid workers who are researching the nutritional needs of the population of Southern Somalia. We plan to carry out a survey to assess the population and nutritional needs and to make recommendations on how best they can be met. To do this we need office equipment including a computer and printer. Cost: \$3,000
8. We are Somali workers involved in construction of latrines. The latrines will improve the sanitation levels and so reduce the spread of disease. We need to buy materials such as cement and corrugated iron. We also need to cover the cost of fuel that provides transport to the villages where the latrines are being built. Cost: \$4,000
9. We are members of an Education Board responsible for the running of a local school. Because of the war many children have not been able to attend school. We are trying to encourage young people in our area to attend our recently constructed school. We need to buy textbooks, sports equipment, teaching aids. We also need to pay four teachers salaries. Cost: \$2,500
10. We are a local women's group interested in linking up with other women's groups at national and local level to discuss possibilities for reconciliation among women of different sub-clans. We also aim to work with these women's groups to identify income generation possibilities and set up small-scale enterprises. We need to run a set of five training workshops for women from four different areas. Cost: \$2,000
11. We belong to a group of young craftsman who have got together to improve the level of training in carpentry and masonry in our area. These skills would provide a source of income for many families. We would like to send one of our villagers on a six-month course on carpentry and masonry in Kenya. On his return he will train the rest of the group. Accommodation, travel and course costs \$5,000.
12. We are members of a Board responsible for operating a local hospital. Recently a new wing was built on to the hospital. This was needed to treat children who have been injured because of the war. We now need to buy beds for the new wing. Cost: \$3,000
13. We are members of a workshop that makes artificial limbs for people who have lost limbs as a result of the war. We need to buy new machinery and to cover the cost of transporting it from Kenya. Cost: \$20,000

The Environment and the Salem Witchcraft Hysteria

by Charles F. Howlett

In November 2001, more than three centuries after they were accused, tried, and hanged as unrepentant witches on Gallows Hills in Salem, Massachusetts, the state legislature approved an act exonerating Bridget Bishop, Susannah Martin, Alice Parker, Wilmot Redd, and Margaret Scott. The descendants of these five were the only ones left to applaud the actions of the Massachusetts legislature. Bishop, Martin, Parker, Redd, and Scott were among twenty men and women put to death during the witchcraft hysteria of 1692. That the Devil was very real in 17th century New England, and Massachusetts in particular, is incontrovertible. Historian John Putnam Demos notes, "the happenstance of everyday life was part of a struggle of cosmic dimensions, a struggle in which witchcraft played an integral part. The ultimate triumph of Almighty God was assured." And yet he adds, "in particular times and places Satan might achieve some temporary success and claim important victims. Indeed, he was continually adding earthly recruits to his nefarious cause" (Demos, 1982: 2-4).

Thousands of suspected witches were hanged or burned in Europe in the sixteenth and seventeenth centuries. Belief in witches was also common in the American colonies. Devout followers of John Calvin subscribed to Exodus 22:18, "Thou shalt not suffer a witch to live." Between the late 1630s, after the non-Separatists led by John Winthrop established the Massachusetts Bay Colony, and 1700, many New England towns supported hearings and proceedings against witchcraft. In Connecticut, between 1662 and 1665, the courts heard almost a dozen cases in which some of the accused were executed while others fled to neighboring colonies. The total number of cases throughout the New England colonies was over a hundred, and at least forty defendants were executed. The most notable instance of witch hunting took place in Salem in 1692.

Near the end of the seventeenth century Salem was a town rife with internal dissention. Perhaps it was a reflection that the religious fervor marking its establishment had given way to economic prosperity defining its later existence. Whatever the case, an old guard of village farmers pitted themselves against the emerging prosperous merchants and town craftsmen. Local governance, which initially combined civil and religious authority, became fractured. Many town meetings were broken up with important issues unresolved and ministers came and left as quickly as the seasons changed. When a small group of troubled girls made charges of witchcraft, mostly against older women they disliked, nineteen people and two dogs were hanged, one man was pressed to death, and over one hundred people were in jail awaiting their fate until a new governor put an end to the madness.



"The Trial of George Jacobs, August 5, 1692"

Over the years there have been numerous historical and fictional works examining these events including "The Crucible," an important play inspired by the McCarthyism of the late 1940s and early 1950s. Movies and TV docudramas have also appeared to recapture and explain this period of religious intolerance in American society. However, not many scholars have examined possible environmental factors behind the 1692 hysteria in Salem.

Historian Mary Matossian has argued that the odd behavior and actions of the adults who were accused and the children who accused them may have been the result of ergot, a fungus that grows on rye in cool, damp climatic conditions. When digested, the fungus can cause symptoms, especially in children, similar to the behavioral actions that occurred at Salem in 1692. It is interesting for students to see how environmental factors can play a role in shaping history, debatable as this particular incident may be.

Matossian followed the lead of Linda Caporeal, a graduate student in psychology at the University of California at Santa Barbara. Caporeal argued that the symptoms the Salem children displayed that suggested they were possessed by the devil – fits, scratching, complaining about being pricked or bitten – were symptomatic of mold poisoning. She looked at court transcripts, climate indicators, diaries, and other records, and zeroed in on climatic conditions and environmental factors. Visions reported by the victims were remarkably similar to those produced by the LSD, which is a chemical derivative of ergot.

While some historians remain skeptical of her observations, it is worthwhile to note that the occasional cold, damp periods in the coastal lowlands may account for rye becoming infected with ergot. According to Matossian, the witchcraft hysteria could be part of a “largely unrecognized American health problem” (Sullivan, 1982: 30). During the witchcraft hysteria several cows and three people suffered from convulsive ergotism. They behaved wildly and experienced epileptic-like seizures before dying.

Students can examine the dietary habits of the early American colonists as part of a class project. What they will find is that rye bread was a dietary staple at that time in American history and wheat was particularly vulnerable to ergot. Next, students can locate climate records from colonial New England.

They will discover that winters were extremely cold from 1690 to 1692. Diaries from this period point out the effects of the weather on planting and living conditions. In addition, maps reveal that most of the homes stricken by the hysteria were situated near marshy land – an indicator that rye grain could have been affected with ergot.

The Salem Witchcraft Trials have been the subject of intense scrutiny. There can be no question that the decline in religious enthusiasm in Massachusetts in the late seventeenth century may account for this tragic event – a delusion fed on ignorance. It is also possible that the expansion of science and knowledge brought an end to this hysteria. But by examining environmental factors including weather and the location of the “bewitched” homes, students can be introduced to a new theory about what may have actually caused the events during those dark days in Salem in 1692. They should not underestimate the impact that the environment has on the course of human events and the history as it was recorded.

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Toxic Waste in the New York State Environment

by Marissa DeLillo

Toxic or hazardous waste is waste material, often chemical, that can cause death or injury to living creatures. It is usually the by-product of industry, but it can also be created by residential use, agriculture, the military, medical facilities, radioactive sources, and commercial outlets such as dry cleaning establishments. Forty million tons of hazardous waste is produced in the U.S. annually. Prior to 2000, there were over 15,000 oil spills in the state of New York. These oil spills were the direct result of leaks from gasoline storage tanks maintained by refineries, tankers or pipelines. This oil contaminates soil, bodies of water, and air we breathe. According to a New York Department of Environmental Conservation (DEC) study, there are currently as many as 161 hazardous substance sites in New York that could pose a significant threat to public health and the environment. Long Island (Nassau and Suffolk Counties) has the highest concentration of toxic waste sites in the United States, which may explain the frequency of cancer among its residents.

Love Canal

The best known toxic waste contamination in New York State occurred at Love Canal in Niagara Falls, New York. The Love Canal crisis began in the spring of 1978 when residents discovered that a dumpsite containing 20,000 tons of chemical waste was leaking into their neighborhood. The dumpsite was once a canal that connected to the Niagara River five miles upstream from Niagara Falls. Over eighty different chemicals, including eleven suspected carcinogens were deposited there. They included pesticides, solvents, PCBs, dioxin, and heavy metals. In 1953, after filling the canal and covering it with dirt, Hooker Chemical Corporation, a subsidiary of Occidental Petroleum, sold it to the Niagara Falls Board of Education for one dollar. Included in the deed was a "warning" about the chemical wastes buried on the property and a disclaimer freeing Hooker of any future liability. In 1954, the Board of Education built an elementary school near the perimeter of the canal. By 1978, there were approximately 800 single-family homes and 240 low-income apartments in the region and about 400 children attended the 99th Street School next to the former dump.

In 1976, after unusually heavy rain, the chemicals began to rise to the surface. As people walked along the street and in their yards, the soles of their shoes corroded. Children and dogs playing in the area received chemical burns. High levels of mental retardation in children, miscarriages, and cancer, were reported. Eckardt Beck, Regional Director of the Environmental Protection Administration, described Love canal as a ticking time bomb.

On August 2, 1978, the New York State Department of Health declared a state of emergency,

ordered the school closed, recommended that pregnant women and young children evacuate, and mandated an immediate cleanup of the site. President Jimmy Carter and Governor Hugh Carey promised to aid homeowners. The cleanup, which began in October 1978, included a drainage trench around the perimeter of the canal to prevent further liquid waste from spreading to the rest of the neighborhood and a clay cap to reduce the amount of water seeping into the former dumpsite. Residents were also tested for cancer.



In 1994, Federal District Judge John Curtin ruled that Hooker/Occidental had been negligent, but not reckless, in its handling of the waste and sale of the land to the Niagara Falls School Board. Occidental Petroleum was sued by the EPA and in 1995 agreed to pay \$129 million in restitution. Today, houses in the residential areas on the east and west sides of the canal have been demolished.

Onondaga Lake

For the first half of the twentieth century, Onondaga Lake, located near Syracuse, New York, provided area residents with recreational activities such as fishing and swimming. It also served as host to a rowing regatta from 1895 to 1952. About 1960, the lake was declared unsafe for swimming because of unsafe levels of fecal bacteria. Later, the government declared that the fish in the lake were unsafe to eat due to high mercury levels. People who consume fish with high mercury levels are at risk of damage to their central nervous systems and autoimmune diseases. Unborn children who are exposed to mercury through their pregnant mothers are highly susceptible to birth defects.

The Onondaga Lake is surrounded by industrial parks, waste beds, and tar beds, which have been identified as sources of pollution. The Niagara Mohawk Power Corporation, was found guilty of dumping contaminated water into the lake and agreed to pay a one hundred thousand dollar fine and provide five hundred thousand dollars to help clean up the lake. The New York State Department of Health remains concerned about the high number of cancer patients who formerly lived near the lake. Today, the lake is one of the most polluted bodies of water in the country.

Newtown Creek

In the early 1970s, it was discovered that oil tanks owned by Exxon Mobil had been leaking for a period of fifty years along the 3.5-mile long Newton Creek, a waterway that separates the boroughs of Brooklyn and Queens in New York City. In 1990, the government ordered companies responsible for the contamination to start the clean up, however it has met with repeated delays. According to Congressional Representative Anthony Weiner, "The ugly truth is that an estimated clean up at this rate won't be completed until 2026."

Mobro 4000

The Mobro 4000 set sail on March 22, 1987 from Islip, New York carrying 3,168 tons of trash. It was headed for Morehead City, North Carolina where the trash was supposed to be turned into methane. However, before the barge could reach its destination, a rumor spread that it contained medical waste. North Carolina officials rescinded its permit and the barge

proceeded along the coast looking for another place to offload. After the Mexican Navy denied it entrance to their waters, the barge continued south to Belize. After being rejected again, it returned to New York, where a temporary restraining order and a heated legal battle prevented it from docking. In October 1987 the trash was finally incinerated in Brooklyn and the ashes were buried back where the barge started its trek in Islip.

Statewide Problem

Public reaction to the threats posed by toxic waste led to the establishment of the federal Superfund Program in 1980, an initiative designed to locate, investigate, and clean up the most hazardous sites nationwide. The Environmental Protection Administration administers the Superfund Program in cooperation with individual states and tribal governments. The Superfund program currently lists six priority toxic waste sites in Albany County, ten in Broome County, six in Cattaraugus County, seven in Dutchess County, seven in Erie County, six in Monroe County, twenty-two in Nassau County, twenty in Niagara County, seven in Onondaga County, eight in Orange County, six in Rockland County, six in Schenectady County, six in St. Lawrence County, twenty-one in Suffolk County, and six in Ulster County (http://www.epa.gov/region02/cleanup/sites/nytoc_county.html, accessed May 21, 2008). New York State currently has 235 schools with 142,738 students on or near toxic waste sites. A complete listing of the school sites can be found on the Web site www.childproofing.org/mapindex.html. Clearly, toxic or hazardous waste is a statewide problem.

There are a number of websites that are useful for teaching about the problem of toxic waste. *Time* magazine has a photo essay showing footage from the Galapagos Islands Oil Spill. The Exxon Valdez Oil Spill Trustee Council website is packed with interesting information including answers to frequently asked questions. The National Oceanic and Atmospheric Administration website has pictures of major oil spills and restoration efforts. The United States Fish and Wildlife Services and Care 4 Nature report on endangered species.

DBQ – Toxic Waste at Newtown Creek

Prepared by Kristin Joseph

Historical Context: Over the past 50 years, instances of toxic waste sites being mismanaged and poorly regulated have led to serious environmental problems for the United States. Since then, both public and private organizations have lobbied for corrective actions for both the environment and the affected citizens. Major New York State sites include Newton Creek in Brooklyn and Love Canal near Niagara Falls.

Task: Toxic waste has greatly impacted the geography and environment of New York City and State, as well as the health and wellbeing of its citizens.

Part A: Analyze each document carefully. Answer the short response questions following each document. Be sure to write your answers in complete sentences.

Part B: Use the documents and your knowledge of social studies to write an essay explaining:

What toxic waste problems exist in the Newtown Creek area?

What effects have these problems had on the environment and the residents of the area?

Document 1: Statement by Rep. Anthony D. Weiner, Sept. 15, 2005

(http://www.house.gov/list/speech/ny09_weiner/051509Pollution.html)

Newton Creek is a 3.5 mile long waterway that flows from the East River and separates the boroughs of Brooklyn and Queens. The State of New York has ruled that the Creek does not meet water quality standards under the Clean Water Act. It is the single most polluted waterway in New York City, and its banks are home to the largest oil spill in the US. The spill is 150 percent the size of the Exxon-Valdez spill. Even though it has been over 25 years since the oil spill was detected, the public health and safety risks associated with the oil spill are still unknown. The law requires that state officials report regularly to determine: the actual current size of the Greenpoint Oil Spill and the extent to which oil from each refinery site contributes to the spill; the spill's impact on existing conditions in the Creek (low levels of dissolved oxygen and high levels of bacteria); the extent to which oil and contaminated sediments in the Creek disperse into New York Harbor; [and] the extent to which the spill has affected aquatic species in the Creek and Harbor, and methods to prevent further harm.

Questions

1. Where is Newton Creek located?
2. What caused the toxic contamination found in Newton Creek?
3. List three ways in which the contamination could be harmful to the environment or residents of New York State.

Document 2 – Newtown Creek

Newtown Creek empties into the East River. Greenpoint, Brooklyn is on the left. Long Island City, Queens is on the right. Manhattan is in the background.

Questions

1. Why was Newtown Creek such a busy waterway in the past?
2. The population of New York City is over eight million people. If Newtown Creek is cleaned up, how could it be used in the future?



Document 3: “A Spill Bubbles Up” by Emily Weinstein (*Village Voice*, April 18, 2006)

“You die of cancer in Greenpoint,” says Tom Stagg, a retired NYPD detective who can name 36 people from his block over the years who’ve had cancer. “That’s what you do.” And that’s one reason Manhattan lawyer Marc Bern was talking to 100 people one evening last week in the Brooklyn neighborhood. “You have been the victims of the oil companies,” he told the crowd at St. Stanislaus Memorial Post, an American Legion hall. A mix of longtime Greenpoint residents and recent immigrants from Poland, they gathered to learn details of a 17-million-gallon oil spill that’s lingered beneath their homes for decades—and the \$58 billion class action suit Bern’s firm filed against Exxon Mobil, BP, and Chevron just a few days earlier.

Document 4: “Suit Seeks Belated Cleanup of 57-Year old Oil Spill” by Alan Feurer, (*New York Times*, 7/18/07)

The New York State attorney general’s office filed a lawsuit yesterday against Exxon Mobil and four other companies to force them to clean up a 57-year-old oil spill that has polluted the soil beneath Greenpoint, Brooklyn, and left traces of toxic chemicals in nearby Newtown Creek. The spill -- said to be originally almost twice as large as the Exxon Valdez disaster, which dumped 11 million gallons of oil off the Alaskan coast in 1989 – resulted from an industrial explosion in 1950. It went undiscovered until 1978, when the Coast Guard found a subterranean pool that contained an estimated 17 million gallons of oil products. In the lawsuit, filed in Federal District Court in Brooklyn, the attorney general, Andrew M. Cuomo, said he is seeking to compel Exxon Mobil and the other companies to speed up the cleanup and to force them to pay millions of dollars in fines. Also named in the suit are BP, Chevron, KeySpan and Phelps Dodge. For years, Greenpoint residents have wondered whether state environmental officials or the companies would finally clean up the spill, which occurred at an oil refinery and storage facility on the Brooklyn-Queens border. In 2004, Riverkeeper, an environmental group, filed its own lawsuit against Exxon Mobil. The following summer, soil tests performed by the group found toxic fumes coming from the ground above the spill. That prompted a second lawsuit by about two-dozen Greenpoint residents. Both suits are pending.

Questions

1. What major industrial organizations have been named in the lawsuit, and why?
2. What have private organizations done to become active in this issue?

Document 5: Toxic Waste below Greenpoint, Brooklyn



1. The subsoil in this area is so saturated by toxins that it can burn.
2. Carcinogenic vapors in this area enter homes.
3. Containment barriers try to block oil seepage into the creek.

Questions

1. What does the shaded area in this map represent?
2. Why does toxic waste in Greenpoint, Brooklyn pose a health problem for people living in the area?

James Florio and the Battle for the Superfund

Congressman, and later New Jersey governor, James Florio was a major player in the campaign for a superfund to clean up toxic waste sites in the United States. In 1993, the Kennedy Library Foundation honored him with its “Profile in Courage Award” for his leadership in securing passage of the federal law. This is an edited version of an opinion essay by James Florio that was published in *The New York Times*, March 15, 1987.

1. Citizens throughout our country can now play a crucial role in the ongoing effort to clean up toxic-waste sites across America. With the enactment of a strengthened and enlarged \$9 billion Superfund program, dozens of new initiatives necessary to overhaul the national cleanup effort have begun. The new Superfund, for the first time, sets strong, uniform national standards for determining how clean a site has to be before it can be removed from the National Priorities List of Superfund sites. It also sets the Federal Environmental Protection Agency on the clear road toward permanent cleanup of Superfund sites, instead of playing its toxic-waste shell game of shifting wastes from one site to another.
2. There are other key provisions that Congress put in the program to insure the aggressive and effective cleanup program that our nation needs to combat the toxic threat we face. But perhaps one of the most important aspects of the new Superfund program is that it greatly expands the public’s ability to participate in the effort to clean up abandoned hazardous and toxic-waste sites. The new law now requires that the public be directly involved in the cleanup effort. The key to a successful Superfund program is public participation. Without the support of the community, cleanup proposals become mired in controversy and solutions are delayed, sometimes interminably.
3. To this point, community involvement at many of the 888 sites on the National Priorities List of Superfund sites across the country has been little more than window dressing to a faltering cleanup process. At their worst, community—relations efforts have involved secret meetings with obscure officials uninterested in informing the public; at their best, such efforts have involved public briefings that left the audience disappointed and confused, with more questions than answers. Efforts at public participation have fallen far short of their essential goal: responding to the fears of residents in communities around waste sites that their health has been damaged by toxic pollution and explaining what the Government plans to do to clean up the mess. Residents of communities around toxic-waste sites not only have the right to be informed of all the options for the cleanup, but they also have the right to be involved in the decisions. Citizen participation is one of the best ways to insure that effective cleanup remedies are chosen.
4. The new Superfund program contains several new provisions designed to reform the public participation process: From now on, a public meeting at every site is an essential requirement before Federal or state governments begin cleanup. The cleanup plan must be disclosed and explained clearly and concisely, with a minimum of technical jargon, so that those affected understand what is happening. The E.P.A. now has the authority to make technical-assistance grants to groups in communities surrounding Superfund sites so that they can hire experts they trust to review government and private-industry cleanup proposals.
5. The more a community is informed and involved in the cleanup process, the more a controversy is reduced and cleanup moves rapidly. Congress expects improved community involvement to be one of the E.P.A.’s top priorities during the second phase of Superfund. As a member of the key House subcommittee with jurisdiction over the E.P.A. and the Superfund, I expect to work with citizens across the country to make sure that the toxic-waste cleanup effort moves forward. Only by winning back the trust of our citizens in their government can we win the battle we have begun to rid our environment of these silent killers.

Late 20th Century Environmental Disasters

by Mohit Shah

During the last two decades of the 20th century major environmental disasters called into question the impact of human activity on the world we live in and raised the question of “who is responsible for protecting the environment and human life?” Among the most notable of these disasters was Bhopal, Chernobyl, and Exxon Valdez.

Bhopal, India

On December 3, 1984, a pesticide plant accidentally released 40 tons of the chemical compound Methyl Isocyanate into the atmosphere. Methyl Isocyanate, which is used in the manufacture of rubber and adhesives, as well as in pesticides, is highly toxic and hazardous to human health. The next day, thousands of dead people and animals (cows, water buffaloes and goats) were found in the streets. There were mass funerals and cremations and bodies were also dumped into the Narmada river.

The chemical cloud either directly or indirectly killed between 3,000 and 15,000 (estimates vary widely) residents of Bhopal, a city in central India. A total of over one hundred thousand people claim to have been injured by the leak. Twenty-five years after the disaster the groundwater around the plant remains contaminated and there are no concrete plans in place for cleaning it up.

During the 1980s, fifteen industrial accidents in the United States released deadly chemicals in volumes and levels of toxicity exceeding those that killed 3,000 people in Bhopal, India, in 1984, according to an Environmental Protection Agency report. But because of good management practices or sheer good luck, no people were killed. – Source: *The New York Times*, April 30, 1989

The pesticide plant was owned by UCIL (Union Carbide India Ltd.), a subsidiary of the American corporation, Union Carbide in partnership with the governments of India and the state government of Madhya Pradesh. A statement by Union Carbide (<http://www.bhopal.com/ucs.htm>) claimed that the leak was caused by employee sabotage. However, critics charge the real culprit was corporate negligence. The plant was located close to a densely populated area, because of budget cuts it was poorly maintained, toxic chemicals were stored in a few large tanks, and there was an inadequate alarm system. Prior to the disaster, local cows died after drinking from a nearby water

well, trade unions representing plant workers complained about health risks in the plant, there was at least one major fire, and there were a series of chemical releases.



Warning sign at the abandoned Union Carbide chemical plant in Bhopal, India.

American courts refused to hear charges against Union Carbide and all cases were transferred to Indian courts. In a lawsuit, claimants originally demanded three billion dollars in damages. In a 1989 out-of-court settlement, Union Carbide agreed to pay less than five hundred million for damages caused by the Bhopal disaster. In 2001, the Dow Chemical Company purchased Union Carbide. Union Carbide and Dow Chemical gave millions of dollars in disaster aid to the people of Bhopal. They also contributed to building a new local hospital and to the Indian Red Cross.

Groups such as the International Campaign for Justice in Bhopal (<http://www.bhopal.net/>) argue that the impact of the Bhopal tragedy has been under

reported and that new toxic waste problems caused by the original leak continue to emerge.

Chernobyl, Ukraine

At 1:23 in the morning on April 26, 1986, there was a chain reaction in core of reactor No.4 in Chernobyl nuclear power plant in the Ukraine. A power surge ruptured the uranium fuel rods and a steam explosion created a huge fireball that blew the roof off of the reactor. The explosion killed at least thirty workers at the power plant. The resulting radioactive plume blanketed the nearby city of Pripyat. The cloud moved on to the north and west, contaminating land in neighboring Belarus, moved across Eastern Europe, and spread radiation over Scandinavia. Eventually, nuclear contamination was experienced as far away as Japan. Initially, there was no acknowledgement by Soviet Union officials that the worst nuclear accident in history was under way. When monitoring stations in Scandinavia began reporting abnormally high levels of radioactivity, the Soviet news agency TASS issued a brief statement acknowledging that an accident had occurred. According to a later report by the World Health Organization, the nuclear disaster released 200 times more radiation than atomic bombs in Hiroshima and Nagasaki.

More than 100,000 people from Prypiat and 76 neighboring villages were evacuated and approximately 600,000 soldiers and workers, known as liquidators, were brought in from all over Soviet Union to help with recovery and clean-up efforts. The core of the nuclear reactor was buried in 300,000 tons of concrete and steel. The concrete and steel is gradually becoming radioactive and nobody knows how much nuclear fuel is seeping out. The last reactor at the Chernobyl nuclear power station was finally closed in 2000.

At first there were predictions that hundreds of thousands, of people might die from radiation-related illnesses. However, only fifty-six deaths have been directly attributed to the accident, including forty-seven emergency workers and nine children who developed thyroid cancer after drinking contaminated milk. Experts now predict that as many as 4,000 former emergency workers and residents of the area may die from radiation-induced cancer. To date, nobody lives in Prypiat. Scientists estimate that city will not be safe for human habitation for another 900 years.

Nuclear Power Plants in New Jersey

In 2003, nuclear electricity generated over half of the electricity in New Jersey. As of January 1, 2005, New Jersey ranked 10th among the 31 states with nuclear capacity. The Salem Creek nuclear plant in New Jersey is one of the nation's largest. The Oyster Creek nuclear power plant is the oldest in operation in the country.

Exxon Valdez Oil Spill

On March 24, 1989, the Exxon Valdez, traveling outside normal shipping lanes to avoid ice, ran aground and spilled nearly 11 million gallons of crude oil into Prince William Sound, Alaska (http://www.eoearth.org/article/Exxon_Valdez_oil_spill). The oil was being delivered from Alaska to California. The oil slick eventually extended for 470 miles at sea, covered 1,000 square miles of water, and affected over 1,000 miles of coast. It was the largest oil spill in United States territorial waters.

Prince William Sound has important fisheries and is surrounded by what were once pristine beaches. It is home to thousands of animals and plant species. The United States Department of Wildlife estimated that 3,000 otters, 300 seals, and 200,000 birds were killed. The accident was blamed on the ship's captain, who had a history of alcohol abuse. Exxon assumed full responsibility for the spill and clean up. More than 11,000 personnel, 1,400 vessels, and 85 aircrafts, as well as local, state, federal, and private agencies, were involved in clean up.

In a plea agreement on criminal charges, Exxon was fined \$150 million, the largest fine ever imposed for an environmental crime. However, the court forgave \$125 million in recognition of Exxon's cooperation in cleaning up the spill. In a civil settlement, Exxon agreed to pay close to a billion dollars to restore the environment. A study conducted by Exxon in 2004 acknowledged that the local environment had not fully recovered.

An important lesson of the Exxon Valdez oil spill was that clean-up efforts using toxic chemicals were more damaging to the environment than the oil itself. In response to the accident, Congress passed a law requiring that all oil tankers in Prince William Sound be double-hulled by the year 2015. If the *Exxon Valdez* had had a double-hull structure, the amount of the spill would have been reduced by more than half.