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WORLDWIDE EMERGING ENVIRONMENTAL ISSUES AFFECTING THE U.S. MILITARY
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Summarizing Environmental Security Monthly Scanning
January 2008—June 2008

The purpose of the monthly scanning reports is to assess worldwide environment-related events in order to identify and analyze issues that might trigger future international environmental regulations and/or modifications to the existing ones with potential implications for the miliraty.

The dramatic increase in world attention to climate change is helping more people understand that the world's environment is a matter of national and global security. Environment is an increasingly important component in forecasting future conflicts. Scientists, policy analysts, and military planners are collaborating to prevent or reduce security threats. The *Army Strategy on the Environment* reflects this new direction.

International environmental governance is improving, and the technological ability to identify environmental threats and crimes is becoming cost-effective through new sensors and communication systems. Environmental damages that people and organizations got away with in the past are less likely to escape detection and punishment in the future.

Environmental diplomacy is increasingly being used to support conflict prevention efforts and to build international confidence, while human security is gaining recognition in both military and diplomatic circles. Environmental security is a link between the two.

The Millennium Project defines environmental security as environmental viability for life support, with three sub-elements:

- preventing or repairing military damage to the environment,
- preventing or responding to environmentally caused conflicts, and
- protecting the environment due to its inherent moral value.

This summarizing paper presents the events and emerging environmental security–related issues identified in the period January 2008–June 2008, organized around this definition.

Some 150 items have been identified during this perios and over 1,000 items since August 2002 when the Millennium Project began this monthly scanning. All the items and their sources, organized by the month when they were identified, are available on the Millennium Project's Web site, http://www.millennium-project.org/millennium/env-scanning.html and the version with Military Implications is available on the AEPI web site http://www.aepi.army.mil/rpt-weei.html.

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Taking ecological considerations into account is crucial if we are to avoid longer-term environmental problems that can undermine security and development, and lead to further cycles of conflict and displacement.

UN Secretary-General Ban Ki-moon
International Day for Preventing the Exploitation of the Environment in War and Armed Conflict, November 6, 2007

The world has moved from a global threat once called the Cold War to what now should be considered the Warming War.

Afelee Pita, Tuvalu Ambassador to the UN

Photos courtesy of: UN, NASA, and ESA

1. Executive Summary

The dramatic increase in world attention to climate change is helping more people understand that the world's environment is a matter of national and global security. Half the world is vulnerable to social instability and violence due to numerous pressures: rising oil and food prices; decreasing water-food-energy supply per person; climate change; and increasing migrations stemming from political, environmental, and economic conditions.

Environment is an increasingly important component in forecasting future conflicts. Scientists, policy analysts, and military planners are collaborating to prevent or reduce security threats. Environmental diplomacy is increasingly being used to support conflict prevention efforts and to build international confidence. International environmental governance is improving, and the technological ability to identify environmental threats and crimes is becoming cost-effective through new sensors and communication systems. Environmental damages that people and organizations got away with in the past are less likely to escape detection and punishment in the future.

General Patterns and Insights

The need for strategic planning to address climate change and environmental degradation tops the agendas of the United Nations, many national governments, official forums, corporations, NGOs, and academic institutions.

The trend toward adopting the precautionary principle versus reactive actions is increasing. Scientists recommend that nations integrate climate change into their security policy to prepare for worst-case scenarios.

The time between the design of a multilateral environmental agreement and its coming into force as well as the time it takes to reach a high ratification level is shortening. International attention is shifting from designing new MEAs to improving the effectiveness of existing agreements.

The increasing ratification of MEAs, the growing numbers of environmental watchdogs, as well as increasing public awareness are improving environmental management globally. The number, precision, and breadth of analytical tools to measure environmental change are improving rapidly.

Efforts are increasing to strengthen international environmental governance by improving institutional structures and interlinkages among treaties, enhancing monitoring systems, and developing international guidelines and frameworks for environmentally sound management.

The decision by the regime in Myanmar (Burma) in May 2008 to block international assistance to 2.5 million cyclone victims raises the question of when human rights and environmental security overrule sovereignty. In the 1990s, UN peacekeeping forces protected the delivery of

food in Somalia without regard to sovereignty. Since similar situations are likely in the future, many are increasingly aware that a framework and international agreement is needed to guide decisions on when international intervention is warranted.

More cooperation is occurring among a variety of institutions for better, more synergistic environmental policy and activities, which expands the scope of environmental considerations among a broader set of actors and the public.

Militaries are increasingly called upon to assist in environmentally related issues, such as natural disasters or conflicts triggered by or affecting the environment, MEA enforcement, and reduction of their own environmental impacts.

Nontraditional security issues—including environment, migration, and social development—increasingly dominate traditional security planning. Since they cannot be addressed by any nation alone, military strategies and geopolitics are being reshaped around complex issues and within international cooperation frameworks.

When international negotiations under the UN fail, nations form coalitions to carry out negotiations and procedures for an international accord. A successful example is the Oslo Process for the Cluster Bombs Convention, which started in 2007 after the 2006 UN negotiations failed. The process led to an agreement formally adopted in May 2008. Similarly, when MEA negotiations prove difficult or government reaction inadequate, idea-centered initiatives emerge and adopt local regulations.

As the world's population grows and biodiversity diminishes, the threat of conflict over resources increases. Environmental problems worsen faster than response policies are currently being adopted. Increased focus for adaptation and mitigation is needed in the multilateral arena (such as the G8, UN Security Council, and UN specialized bodies) to strengthen international regulations, improve capacity building from detection to adaptation, address migration issues, and adapt cooperation among countries to the new realities induced by climate change.

Rising sea levels and melting ice caps will redraw physical boundaries, potentially forcing the evacuation of island nations like Tuvalu in the South Pacific and causing tensions over new shipping routes, such as the Northwest Passage. The panoply of issues triggered by Arctic ice thawing reflects the amplifying debate between environmental aspects and political and military interests.

MEAs often conflict with national economic or political interests, generating issues of noncompliance with international treaties, lack of cooperation with international organs, and deadlock in many international treaty–related negotiations. Matters of disagreement are mostly related to strategies for greenhouse gas emission cuts, nuclear nonproliferation, addressing security aspects of environmental implications, and outer-space security issues.

Environmental issues are a "conflict threat multiplier." Most conflicts are occurring in the least environmentally sustainable regions, and unless environmental and conflict factors are simultaneously addressed, neither are likely to be resolved successfully.

Without more serious mitigation and adaptation measures, mass migration and conflicts seem inevitable due to climate change, falling water tables, and other contributing environmental factors. Nevertheless, there is no adequate international system or framework to cope with environmental refugees, estimated to reach 250 million by 2050.

The accelerating rate of technological change has fundamentally changed the spectrum of threats to the environment and human health, such as e-waste, possible risks of using nanotechnology and biotechnology, use of chemicals, and the spread and safety of nuclear, chemical, and biotechnology labs.

Work is under way to develop a global system for countering pandemics from either natural or terrorist causes.

Developing countries are rapidly adopting environmentally sound policies and increasingly restricting richer countries' export of polluting industries to poorer regions. Nevertheless, stronger international and transinstitutional coalitions and frameworks are needed to counter global environmental crime, such as illegal trade in hazardous wastes, smuggling proscribed hazardous materials, and exploiting and trafficking protected natural resources.

Earth observation data provided by satellite systems are becoming an essential tool for designing sustainable development policies and early warning mechanisms. Although space technology enhances Earth surveillance, provides early warnings of natural disasters, improves compliance mechanisms, and increases understanding of space and Earth phenomena, local on-the-ground coordination and applications are still deficient.

The costs are falling for nanotech environmental sensors, which can be connected to global information systems via satellite, potentially making environmentally damaging actions known instantaneously and worldwide.

ICT and robotics, new detection and cleanup techniques, and more environmentally friendly warfare contribute to reducing the military environmental footprint.

Preventing or Repairing Military Damage to the Environment

The UN reports that about half of all conflicts over the past 20 years were "re-conflicts"—those that recurred within five years of peace accords. Many had environmental backgrounds. There is consesnsus that failed states are the most vulnerable to climate change and possible conflicts due to environment-related issues.

Environmental degradation and hazardous ordnance leftovers in post-conflict areas threaten the livelihoods and health of current and future generations and may constitute an impediment for

lasting peace. There should be a "green chapter" in the Geneva Conventions for safeguarding the rights of the environment.

National Security and the Threat of Climate Change, a report by a group of high-ranking U.S. military officers and national security experts, warns that "climate change could seriously exacerbate already marginal living standards… causing widespread political instability and the likelihood of failed states.... The chaos that results can be an incubator of civil strife, genocide, and the growth of terrorism."

The military is increasingly called to take part in post-conflict reconstruction efforts and environmental restoration to build stability, as well as in mitigation of environmental effects to avoid conflict. The report entitled *A Climate of Conflict* by Dan Smith and Janani Vivekananda published by International Alert in London warns that unless adequate and timely adaptation policies are implemented, more than half of the world's nations are at risk. It identifies 46 countries—home to 2.7 billion people—at high risk of armed conflict, while another 56 states—with a total population of 1.2 billion—are at risk of political instability.

Conflict and environmental degradation exacerbate each other. Middle East countries are among the least environmentally sustainable, and conflict has caused massive damages to ecosystems from Iraq to Lebanon and North Africa. Refugees, human rights groups, and legal experts have urged the International Criminal Court to consider human-made environmental crimes along with terror and mass killings in the prosecution of Sudanese officials and Arab Janjaweed. They argue that the crisis was aggravated by the ecological destruction used by the government as a weapon to force people to move. The number of refugees in camps reached 2.2 million and the risk of unrest is increasing as resources are getting exhausted. The deployment and work of the joint UN-African Union force of 26,000 peacekeepers is jeopardized by lack of water. In 2007, an estimated 26 million people were internally displaced by armed conflicts and violence worldwide.

Many post-conflict health and environmental impact assessments are ongoing, as are liability disputes. The Portfolio of Mine Action Projects 2007 found that 26 out of 29 war-ravaged countries or territories surveyed are beleaguered with the lurking remnants of cluster bombs and other explosives. Protocol V on Explosive Remnants of War of the Convention on Certain Conventional Weapons came into force in November 2006. The Convention on Cluster Munitions was formally adopted in May 2008, legally binding the use, production, transfer, and stockpiling of cluster munitions and committing countries to clear areas contaminated by cluster munitions and to assist victims and affected communities.

Concerns over the environmental and health effects of the use of depleted uranium munitions are resurfacing and increasing worldwide. The European Parliament adopted a resolution calling on the EU to lead negotiations "through the UN or through a 'coalition of the willing'" for a global treaty to ban depleted uranium weapons.

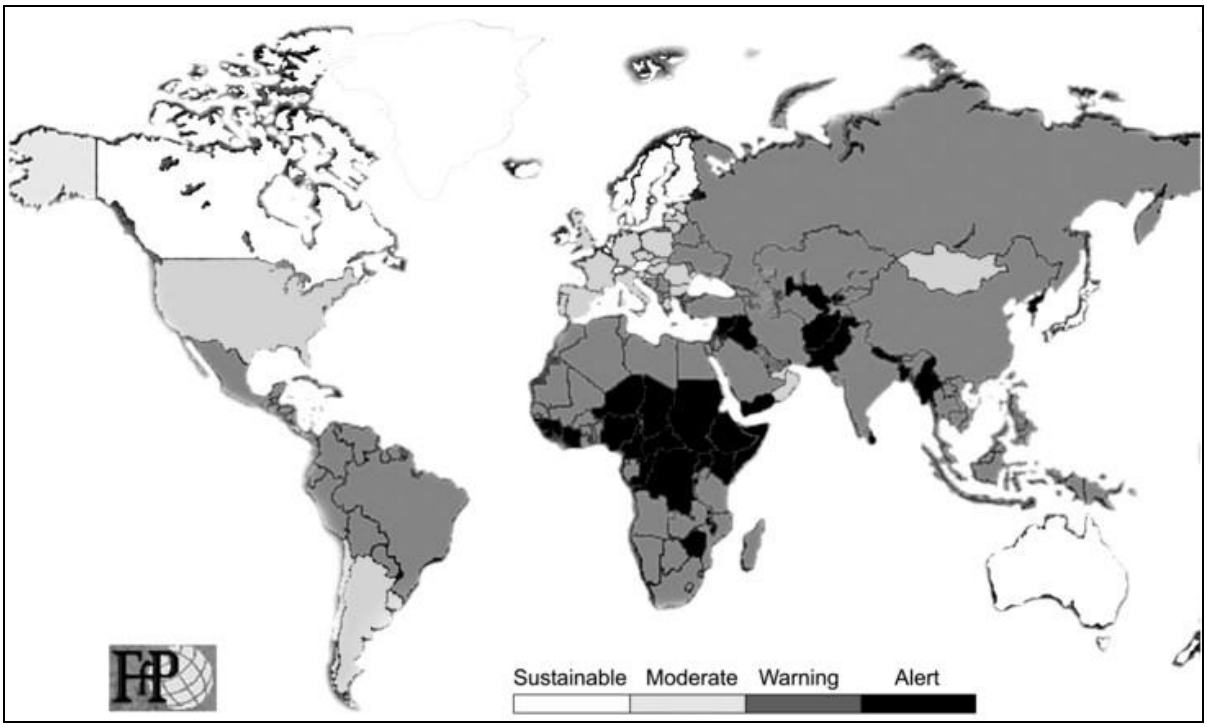
Over the past 10 years, only 30% of known chemical weapons stocks have been destroyed. The remaining 70% are supposed to be totally destroyed by 2012 to meet the Chemical Weapons Convention. Japan is not on schedule to meet its obligations toward China in the recovery and destruction of hundreds of thousands of chemical weapons abandoned at the end of World War II

and will most probably not meet the April 2012 deadline. Some experts argue that "nonlethal" materials such as "incapacitating agents" are toxic chemicals that would violate the CWC if used on the battlefield. Clarification of what chemicals will be allowed under the treaty's exceptions is needed.

Advances in biosciences not met by adequate security systems increase the risks of their potential misuse, the threat of biological weapons, and the likelihood of SIMAD, for Single Individuals Massively Destructive. The Biological Weapons Convention might need to be revised in view of the new synthetic biology developments, and verification and monitoring regimes would need to be developed to ensure compliance. Over 150 nations have fulfilled their reporting responsibilities to the Security Council regarding efforts to combat the proliferation of weapons of mass destruction by non-State actors.

New technologies are offering improved detection, cleanup, monitoring, and surveillance possibilities. WHO is developing a global epidemic simulator based on the model of climate monitoring systems. Small robotic helicopters operated by radio control could be used for reconnaissance and surveillance. High-sensitivity portable chemical and biological devices offer high accuracy detection, monitoring, and cleanup possibilities with rapid response time. However, future autonomous robotic weapon systems (without human decision-making control) are increasing vulnerability and concern over possible catastrophes.

In order to prevent the misuse of science, it is important to strengthen the scientific expertise of security organizations and to create an independent science and technology advisory committee for intelligence agencies, as well as to promote within the international scientific community a common culture of awareness and responsibility.



Source: Fund for Peace

Preventing or Responding to Environmentally Caused Conflicts

Increasingly scarce resources, climate change, biofuels, and growing population and higher living standards are all contributing to the long-term rise of food prices. In 2007, dairy prices rose nearly 80% and grain 42%. If this trend continues, the number of people facing famine or malnutrition is expected to grow from at least 850 million today to 1 billion, increasing instability. Food riots have already occurred in some 30 countries, including recently conflict-torn nations such as Haiti, Côte d'Ivoire, Senegal, and Somalia. Meantime, a few agricultural biotechnology companies are trying to concentrate corporate power and gain monopoly over a large part of global food, in some cases undermining agricultural productivity and jeopardizing national food security. With nearly 3 billion people making $2 or less per day, long-term global social conflict seems inevitable without more serious food policies, scientific breakthroughs, and dietary changes. A new UN Task Force on the Global Food Crisis was designated to prepare a comprehensive plan of action to tackle the rise in food prices.

The UN, OSCE, and NATO are paying increasing attention to environmental security. The UN Security Council debated the relationship of security and the environment for the first time in history in April 2007 and more recently acknowledged that the UN should move from a culture of "reaction" to one of conflict "prevention" and should develop potential tension detection mechanisms. The OSCE adopted a Ministerial Declaration on Environment and Security, and the NATO Security Science Forum on Environmental Security addressed the security implications of environmental issues, forecasting, and cooperation with other international organizations.

The number of weather-related disasters worldwide now averages 400–500 a year compared with 125 in the early 1980s. The number of people affected by natural disasters in 2007 reached 200 million. The UN notes that seven times more livelihoods have been devastated by natural disasters than by war worldwide, and this is likely going to be worsening due to climate change. The intensity of Atlantic storms has nearly doubled over the last 30 years, and computer models show a direct link between climate change and the strength of storms. Some officials say that climate change should be addressed like World War III.

UNEP warns that changing temperatures, rapid rates of species extinction, and unsustainable depletion of the world's scarce resources are the most important threats to human survival. The *Climate Change and International Security* paper to the European Council notes that the "impact of climate change on international security is not a problem of the future but already of today and one which will stay with us" and underlines that the European Security Strategy and related proposals "should take account of the security dimension of climate change."

The WMO reports that the decade of 1998–2007 was the warmest on record, with the global mean surface temperature for 2007 estimated at 0.41°C (0.74°F) above the 1961–1990 annual average of 14°C (57.20°F). Extreme temperatures in 2007 included unusually cold winters in South America and heat waves in Europe. Some scientists believe that weird weather patterns might become the norm and that the world is more than 50% likely to experience serious climate change, for we are unlikely to keep greenhouse gas levels low enough to avoid the critical 2ºC (3.6ºF) temperature rise.

Climate modelers at the UK's Hadley Centre for Climate Prediction and Research show that by 2015 the average global temperature will be 0.5°C above the average value for the last 30 years and that between 2009 and 2015, half the years will be warmer then the current warmest year on record. The IPCC projects that in 2090–2099 relative to 1980–1999, temperature rise could range between 0.3°C and 6.4°C.

The Arctic is warming faster than the rest of the world. The region might be ice-free in summer in the next 10–20 years, although some scientists say that there is a 50% chance for that to happen in 2008. In 2007, the Arctic sea ice shrank to 22% less than the record since satellite measurements began nearly 30 years ago, looking similar to some forecasts for 2030 to 2050. The thawing of Arctic sea ice opens up the Northwest Passage as an international shipping route, with access to rich resources—including oil—triggering international disputes over sovereignty and ecological implications. The debate is intensifying as several countries are building their political and legal cases to claim jurisdiction over different (and sometimes overlapping) areas. The Ilulissat Declaration signed in May 2008 by Canada, Denmark, Norway, Russia, and the U.S. is a commitment for applying the UN Law of the Sea "to the orderly settlement of any possible overlapping claims," stipulating that there is "no need to develop a new comprehensive international legal regime to govern the Arctic Ocean." Critics say that this opens the possibility for a polar "carve up" by the five countries.

Although the Antarctic should be protected by the 1959 Antarctic Treaty and related agreements, Britain's Foreign Office plans to claim 1 million square kilometers (386,000 square miles) of seabed off the coast of the British Antarctic Territory. Similar claims for seabed areas might also be submitted by Chile and Argentina, which might overlap some of the British territorial claims. Greenpeace and WWF warned that Britain's possible oil, gas, and mineral exploration in the region would represent an environmental disaster for the fragile ecosystem.

Glaciers—representing the only freshwater source for millions of people around the globe—are melting and thinning at an accelerating rate over the past decade. The most vulnerable are Earth's subtropic zones—home to 70% of the world's population—including parts of the Middle East, southern Africa, the U.S., South America, and the Mediterranean. The IPCC estimates that rising temperatures could melt most of Latin America's glaciers by 2022, affecting the livelihood of people in Peru, Ecuador, and Bolivia. In some regions, demand for water might exceed supply as soon as 2009. Himalayan glaciers are the main source for Asia's nine largest rivers. UNEP estimates that by 2025, some 1.8 billion people will live in countries with absolute water scarcity. The Human Rights Council is considering adopting water as a human right and is assessing the relationship between climate change and human rights.

Ice caps and glaciers contribute 60% of the ice melting that is one cause of increasing sea levels; 28% of this comes from Greenland and 12% from Antarctica. Estimates of sea level rise by 2100 due to global warming vary from the 9–88 centimeters projected by the IPCC to as much as 140 centimeters. Satellite measurements show that since 1993 global averaged sea level has been rising at about 3 millimeters per year, considerably more than the twentieth century average of about 1.7 millimeters per year. By 2025 coastal population is expected to reach 6 billion.

The small island-state of Tuvalu could disappear in 30–50 years. Indonesia said it has lost 26 islands to climate change. Bangkok, with a population of more than 10 million, might be submerged within the next 15–20 years. It is one of 13 of the world's 20 largest cities at risk of being swamped as sea levels rise in coming decades. Increased salinity and flooding could displace over 70 million people in Bangladesh, 22 million in Vietnam, and 6 million in Egypt. China's Pearl River Delta, the country's most economically dynamic region, is expected to be the worst hit by rising sea levels by 2050. Maldives President Maumoon Abdul Gayoom called for recognition of "environmental protection as a fundamental human right" and announced that the Maldives will initiate a debate on the issue with the Human Rights Council.

Disasters could be exacerbated by other consequences of glaciers melting, such as dilution in salinity of the sea around Antarctica, which could have significant effects on the world's climate and ocean currents, and melting ice caps that may trigger more volcanic eruptions.

Most of the countries with the highest birth rates are those already affected by the world's worst wars. Growing pressure of people on land and resources is likely to exacerbate conflict in those areas. Desertification affects more than 250 million people, and 1 billion more are at risk. In Africa, the worst rains in 30 years caused flooding affecting an estimated 1.5 million people in 22 countries, including Ethiopia, Niger, and Sudan. Semiarid areas of sub-Saharan Africa with some of the highest concentrations of poverty in the world face potential productivity losses of 25% by 2060.

By 2050, some 250 million people could be permanently displaced by climate change–related phenomena. UNHCR remarks that after several years of decline, the number of refugees began rising again. Without a legal framework to address environmental refugees' situation, their rights will not be addressed and conflicts will be difficult to avoid. The Global Humanitarian Forum, launched in October 2007, is being set up by former UN Secretary-General Kofi Annan to address in a preventive and proactive way global refugee movements and humanitarian crises triggered mainly by climate change. It will act as a catalyst among the different interest groups involved in international disaster relief and prevention: governments, aid agencies, the military, the business world, and academics.

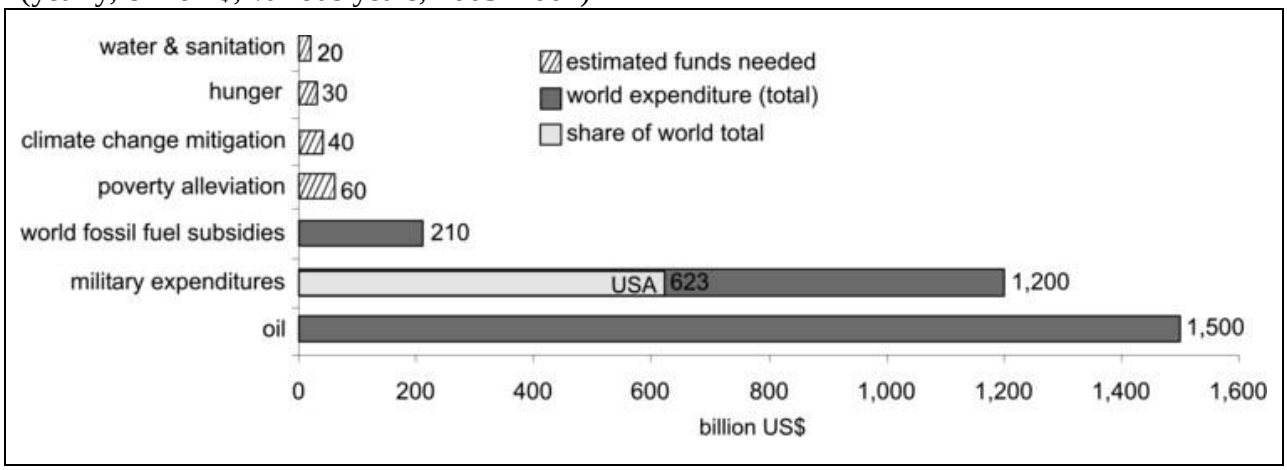
The World Health Organization warns of the increasing risk of disease outbreaks, epidemics, industrial accidents, natural disasters, and other health emergencies, which could become threats to global public health security. The International Health Regulations, which came into force in 2007, are helping countries collaborate to identify and contain risks from outbreaks and other health hazards. WHO points out pandemic influenza as the most feared threat to health security.

Increased research is needed to identify areas of highest vulnerability and instability and to consider climate change in foreign aid programs. Military and police will have to change from reactive to proactive strategies in order to prevent and manage security issues triggered by climate change. Unrest could range from protests against polluting companies and government inaction to new forms of ecoterrorism.

The Bali Action Plan provides a roadmap of adaptation and mitigation measures. However, the funding of programs and technology transfer is falling short. While it is difficult to have the

world commit $30 billion a year to prevent conflicts over food, the subsidies to fossil fuel industries amount to over $200 billion per year, $1.2 trillion is spent on the military, and $1.5 trillion is spent on oil.

Expenditures and estimated costs of various programs
(yearly, billion $, various years, 2003–2007)



Protecting the Environment Due to Its Inherent Moral Value

Plant and animal species are being lost at a rate between 100 and 1,000 times natural extinction rates. WWF and the Global Footprint Network report that humanity's impact on the planet has more than tripled since 1961 and that Earth's resources are being used faster than they can be replaced by nature. If present trends continue, by 2050 humanity will demand twice as much as the planet can supply. The Millennium Ecosystem Assessment reported that 60% of Earth's vital ecosystem services are being degraded or used unsustainably.

There are more than 700 MEAs. The focus of international negotiations is switching from designing new treaties to reinforcing existing ones and strengthening international environmental governance. Evaluation mechanisms of the effectiveness of these agreements are improving. Nevertheless, noncompliance with international treaties and lack of cooperation with international organs, as well as deadlock in many international treaty–related negotiations, continue to be an international concern.

The 2007 UNEP Governing Council adopted decisions on issues related to strengthening international environmental governance (including the draft Environment Watch Strategy Vision 2020 and coordination and synergies among multilateral environmental agreements) and improving the assessment of the world environmental situation and mitigation actions. There are efforts for better integration of the existing MEAs that cover related issues, such as the Basel Convention on Waste and the Stockholm Convention on POPs for developing a framework for environmentally sound waste disposal.

The EC's three-year program to modernize EU legislation—as part of its commitment to simplify the EU system of rules—started with the environment-related sector, since it is the most

heavily regulated. The EU is also adopting the protection of the environment through criminal law. The European Environmental Liability Directive came into force, establishing a comprehensive responsibilities framework based on the "polluter pays" principle. The European Commission opened several infringement procedures against member states for not complying with EU environmental legislation.

Increasingly powerful analytic models and tools are being created to compare national environmental status. New international watchdog bodies emerge and others are being proposed to assist legal action against environmental crimes.

Some noteworthy environmental agreements or regulations that were recently adopted or strengthened or are in negotiation are presented in Box 1. A complete list and further details on the agreements are available in sections 1 and 2.

Negotiations have begun for a post-2012 treaty to reduce greenhouse gas emissions. The Bali Action Plan adopted in December 2007 outlines a two-year agenda of negotiations for a global climate regime to enter into force by 2013 but does not include emissions reduction targets, despite strong support by the EU and other countries. The final agreement is to be adopted at the end of 2009 at the Copenhagen summit. It should include both national and international mitigation and adaptation actions to address the effects of climate change, methods to reduce greenhouse gas emissions, development and transfer of climate-friendly technologies, and financing and investment measures. Meantime, questions are growing about better enforcement mechanisms of the Kyoto Protocol to compel governments to respect their commitments.

Aviation and shipping, industries not covered by the Kyoto Protocol, account for some 5–8% of global greenhouse gas emissions. IMO estimates that the shipping industry's share of global CO_2 emissions could grow from about 4.5% in 2007 to 6% in 2020. Europe projects shipping emissions to grow by 32% and aviation by up to 90% over the same period and therefore is advocating emission reduction targets for these two sectors.

A growing number of industries and local governments are developing appropriate environmental and energy policies and regulations in the absence of national leadership. In many cases these are based on international standards or agreements. Civil society in some countries is increasingly involved in the design of local and regional regulations, in many cases with the help of international NGOs.

Trade of endangered species and hazardous substances is increasingly profitable, difficult to tackle, and involved with international organized crime. Custom administrations reported more than 9,800 endangered species (CITES violations) and 220 hazardous waste seizures in the last few years. The Basel Convention estimates international haz-ardous waste movement to be at least 8.5 million tons per year. Although it is difficult to estimate the illegal portion of this, a project undertaken in 13 European countries found that over 50% of the waste shipments examined were illegal. There could be even higher percentages in countries with fewer inspection capabilities and in failed states. The 20–50 million tons of e-waste generated annually is growing worldwide, and about 70% of it is dumped in developing countries in Asia and Africa.

Box 1

Some accords and regulations related to environmental security recently adopted, strengthened, in negotiation, or proposed

- International Convention for the Suppression of Acts of Nuclear Terrorism (entered into force in July 2007)
- Convention on Cluster Munitions (adopted in May 2008)
- EU resolution to lead negotiations for a global treaty to ban depleted uranium weapons (adopted in May 2008)
- Stockholm Convention evaluation mechanisms (adopted in May 2007) and continued negotiations for noncompliance mechanisms (expected for 2009)
- Non-Legally Binding Instrument on All Types of Forests (adopted in December 2007)
- International Declaration of Reef Rights (received first signatures)
- Network of Marine Protection Areas, to be adopted by 2012
- Bali Action Plan and other negotiations for post-2012 treaty to curb greenhouse gases
- Tougher regulations for mandatory greenhouse gas emission targets are being adopted by countries, regional authorities, local governments, and industries
- European Environmental Liability Directive (entered into force in April 2007)
- EU protection of the environment through criminal law (proposal approved in May 2008)
- Registration, Evaluation and Authorization of Chemicals (REACH) (entered into force in June 2007)
- EU Revised Green List of the Waste Shipment Regulation (entered into effect in December 2007)
- EU legislation on transboundary shipments of waste (entered into force in July 2007)
- International Convention on the Control of Harmful Anti-Fouling Systems on Ships (enters into force in September 2008)
- EU airlines mandatory participation in carbon trading scheme to start in 2011
- Fine Particles Air Quality Directive (adopted in December 2007)
- Tougher European waste management strategy with reduction targets to 2008, 2012, 2020
- China's restrictions on plastic bags (effective June 2008)
- Restrictions for harmful underwater sonar to protect marine mammals (proposed)
- A global ban on mercury (in negotiation)
- Conventional light bulbs to be banned in many parts of the world by 2012

At a high-level meeting in April 2008, the World Customs Organization, representatives of UNEP, customs administrations, and other interested organizations agreed on an Action Plan to improve enforcement and tackle increasing environment crime. The plan calls for increased detection efficiency by customs offices, creation of environmental crime units, and international cooperation and information exchange.

The EU legislation on transboundary shipments of waste came into effect in July 2007, establishing a legal framework to ensure that waste is properly handled from the time it is shipped to the time it is disposed of or recovered.

More than 50,000 chemical compounds are used commercially, hundreds more are added annually, and UNEP estimates global chemical production to increase by 85% over the next 20 years. There are fears that the International Strategy for Chemicals Management adopted in 2006 is not strong enough to ensure adequate security and that a biosecurity watchdog and codes of conduct for scientists should therefore be established. Policymakers and experts reinforce the need to apply the precautionary principle in the context of chemical safety, to extend globally the regulations on heavy metals, and to tackle the widening gaps among countries in following chemical safety policies.

Studies on the environmental and health impacts of various forms of nanotechnology, as well as international research projects on regulating nanotechnologies and adopting nanotechnology standards, are increasing rapidly around the world. The first nanotechnology genotoxicity tests found that carbon nanotubes could damage DNA. China was the first nation to set standards; the European Commission has adopted a Code of Conduct for Responsible Nanosciences and Nanotechnologies Research; the UK's Royal Society and a group of other organizations have begun an initiative to develop a "Responsible NanoCode" for businesses working with nanotechnologies, while Indian scientists warn that India faces serious nanotech environmental health and safety issues due to absence of guidelines on nanoparticle toxicity and biosafety regulations in India and worldwide.

Biotechnology industry is expanding rapidly, and the supervision of controversial experiments is voluntary and irregular at universities and private laboratories around the world. The Convention on Biological Diversity needs to be adapted in view of the new developments, and verification and monitoring regimes should be developed to ensure compliance. In May 2008, the timetable and framework were set for a liability and redress regime concerning potential damage caused by the movements of GMOs, which will be further discussed in October 2010 at the next meeting of the Parties to the Cartagena Protocol on Biosafety. An ad hoc technical expert group was mandated to consider the risk assessment and risk management issues of GMOs.

UNESCO's Man and the Biosphere network is expanding, comprising now 529 sites in 105 countries. The UN notes that only 0.6% of the oceans are protected compared with 12% of the world's land, and a roadmap was launched in 2007 to meet the goal of establishing a network of marine protected areas by 2012. The global map of human impacts to marine ecosystems reveals that while no ecosystem is completely unaffected, human activities had high impact on over 40% of the world's ocean-covered area, with the most affected being the North Sea, the South and

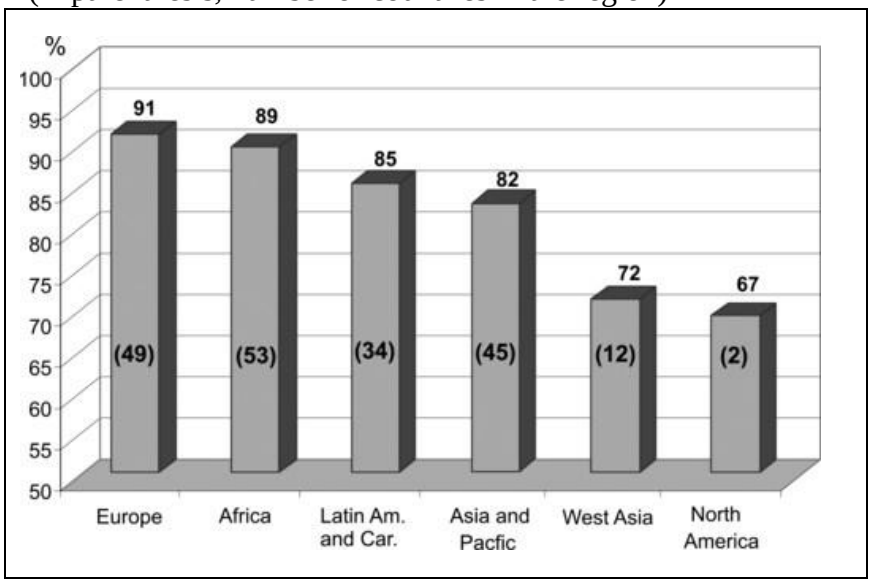
East China Seas, the Caribbean, and North America's East Coast. Although the UN Convention on the Law of the Sea is recognized as the legal framework for all activities in the oceans and seas, the debate continues on how the convention applies to marine genetic resources in areas outside national jurisdictions. The EU Marine Strategy Directive requests member states to adopt by 2015 strategies to attain good environmental status by 2020.

Space observations have become a major tool for monitoring environmental change, helping policymakers develop adequate strategies, assisting in the enforcement of environment-related regulations, and improving early warning and disaster management. Examples of these include NASA's computer model to anticipate food shortages/crises, a new UN Outer Space Affairs office as part of a future network dedicated to carry out the UN Platform for Space-based Information for Disaster Management and Emergency Response, the Global Monitoring for Environment and Security, and support for early warning systems at global and regional levels.

* * *

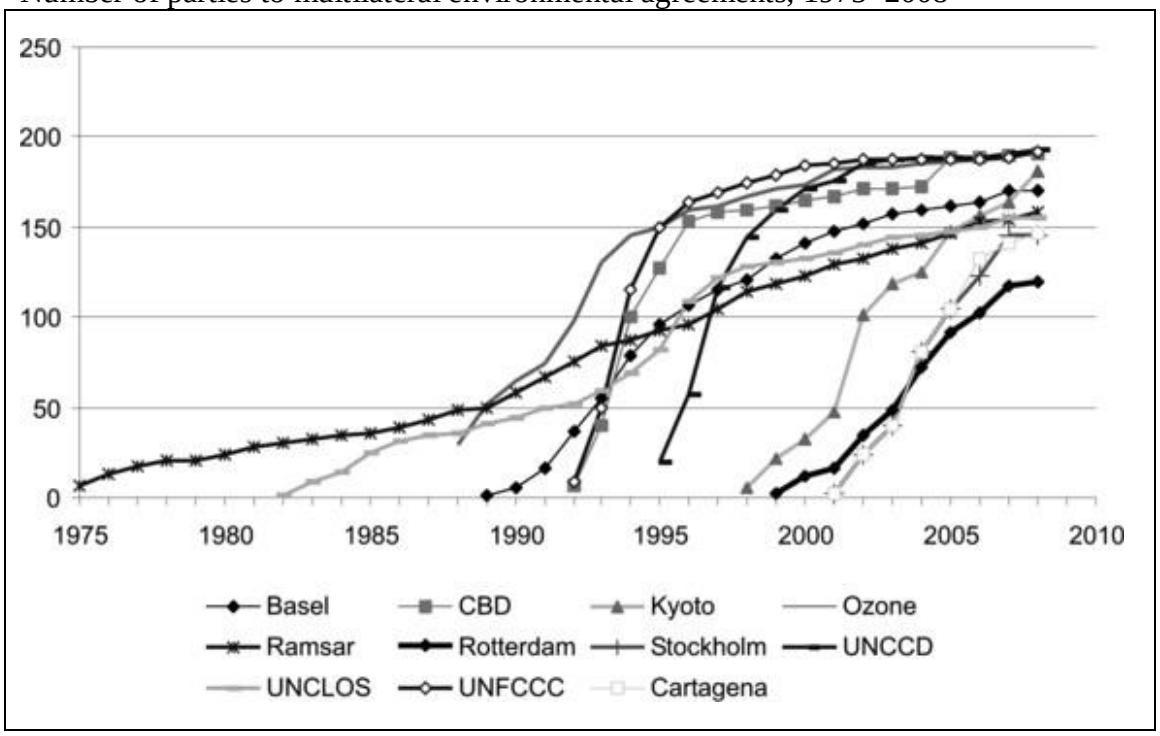
Environmental security analysis should include the impacts of new kinds of weapons; asymmetrical conflicts; increasing demands on natural resources; urbanization (which makes more people dependent on vulnerable public utilities); impacts of environmental degradation and climate change; continued advances in environmental law, with escalating environmental litigation; and the globalization that is increasing interdependencies. In view of increased threats of conflicts triggered by environmental factors, enforcement of international multilateral agreements should be strengthened. The following graphs reveal significant efforts on ratifications; however, more efforts are needed in the area of implementation of the regulations, as well as in developing a global environmental consciousness.

Ratifications of 12 multilateral environmental agreements, by UNEP GEO regions
(in parenthesis, number of countries in the region)



Source: UNEP GEO Data Portal with updates by the Millennium Project

Number of parties to multilateral environmental agreements, 1975–2008



Source: UNEP GEO Data Portal with updates by the Millennium Project

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A Preventing or repairing military damage to the environment

ENVIRONMENTAL SECURITY RISES ON THE INTERNATIONAL POLITICAL AGENDA

Environmental Ministers Advance Global Consensus at UNEP Forum

More than 100 environment ministers met in Monaco for the 10th Special Session of the Governing Council/Global Ministerial Environment Forum of the United Nations Environment Programme (UNEP) on February 20-22. The UNEP Medium-term Strategy 2010-2013 was adopted, which upgrades UNEP's ability to be more effective in addressing climate change, disasters and conflicts, ecosystem management, environmental governance, harmful substances and hazardous waste, and resource efficiency – sustainable consumption and production. The theme of the Special Session was "Globalization and the Environment—Mobilizing Finance for the Climate Challenge". Issues discussed included long-term predictable carbon prices, building public-private partnerships, regionally balanced distribution of funds, UNEP management to implement the Bali Strategic Plan, and better implementation of multi-lateral environmental agreements.

The discussions and ministerial consultations focused on:

- policy issues and strategies for mobilizing finances to address climate challenges, with the main issues being related to: a coherent international framework for addressing climate change; long-term predictable carbon prices; building public-private partnerships; and a balanced distribution of funds by region and scope;
- strengthening international environmental governance and UN reform, mainly related to UNEP organizational aspects, and to improving the environmental international regulations system, by addressing synergies between existing multilateral environmental agreements in order to simplify understanding of the MEAs' implementation, and compliance monitoring. Although there is consensus on the need to strengthen international environmental governance (IEG), there is no agreement on how to do it. Views range from supporting a more powerful and coherent IEG (including an eventual UNEO) with reform negotiations starting at the General Assembly's 63rd session, to favoring the status quo with slight improvements. An interesting suggestion was made by Botswana, who noted that for an effective transboundary ecosystem management, neighboring countries should be parties to the same conventions. The US asked that the final report include language requesting that cooperation among MEAs should be subject to the approval of their governing bodies.

The Forum adopted decisions in five areas:

- the UNEP Medium-term Strategy 2010-2013—formulating the strategic frameworks and programs of work and budgets
- chemicals management, mainly concerning the implementation of the decisions related to reducing hazards from mercury, and improving waste management;
- improving the Global Environment Outlook (GEO), including the development of a global assessment of environmental change and its implications;
- inviting ECOSOC to declare 2010-2020 the International Decade for Addressing Climate Change;

- sustainable development of the Arctic region, mainly continuous environmental assessment (including increased international scientific collaboration) and addressing legal aspects.

At the Forum, UNEP also launched the Climate Neutral Network (CN Net) to assist nations and interested actors with reducing greenhouse as emissions (http://www.climateneutral.unep.org) [February 2008. Military Implications, Sources]

Briefings on Environmental Security at NATO Conference

Prior to the NATO Summit in April, the NATO Security Science Forum on Environmental Security held in Brussels on March 12th addressed security implications of environmental issues such as climate change, water, energy security, and natural catastrophes. It also looked at environmental security forecasting and cooperation with other international organizations to increase environmental security. Webcasts of the presentations are available on the first website listed below. After the NATO Summit in April in Romania, Russian President Vladimir Putin and NATO leaders agreed to cooperate in several areas, including environmental security. [April 2008. Military Implications, Sources]

World Leaders Discuss Environmental Security Policies at Davos

Business and political leaders exchanged ideas for addressing climate change, water shortages, conflict, terrorism, UN Millennium Development Goals, globalization, and new technologies at the World Economic Forum held in Davos, Switzerland, January 23-27, 2008. Japan's Prime Minister Yasuo Fukuda advocated new climate-change initiatives, including national CO_2 reductions for major emitters, increasing global energy efficiency 30% by 2020, and a new multilateral fund to mitigate climate change and to support developing countries to cope with global warming. He also announced that Japan—holding this year's G8 presidency—will place climate change at top of the July G8 summit agenda. U.N. Secretary-General Ban Ki-moon asked business and political leaders to make water issues and scarce supplies top priorities, citing environmental factors increasing and/or maintaining conflicts. Business leaders pledged millions of dollars for helping development and agriculture in poor countries by also improving the environment and water use and access. It was suggested that a certain amount of clean water for drinking should be seen as a human right, but water used for economic reasons should be priced to assure its efficient use. [January 2008. Military Implications, Sources]

Branson calls for War Room on Climate Change at the United Nations

During the special UN General Assembly session "Addressing Climate Change: The United Nations and the World at Work," Sir Richard Branson, chairman of the Virgin Group, offered a $25 million prize for technology to clean CO_2 from the atmosphere and challenged the world to help him create a war room to manage the attack on climate change. Although it would be independent of the UN, it would include the participation of the UN, corporations, governments, NGOs, and universities in its design, information systems, and management. Key themes of the General Assembly speeches were: 1) partnerships among UN, government, business, NGOs, and universities; 2) global alliances for action; 3) better UN coordination to address Climate Change; 4) rich nations pay for poorer nations' adaptations to meet climate change challenges (since the poorer countries contribute the least to greenhouse gases, but will suffer the most from global warming; hence, the richer nations should pay for the poorer nations adaptation measures); 5) need for a global long-term strategy; 6) shared but differential responsibilities among nations to

address climate change; 7) technology transfer and issues of intellectual property rights; 8) early warning systems for adaptation; and 9) "it is too late to say later." [February 2008. Military Implications, Sources]

INTERNATIONAL TREATIES RELATED TO ENVIRONMNETAL SECURITY AND MILITARY ACTIONS

African Countries Call for International Ban on Cluster Bombs

The first meeting of African countries on cluster bombs adopted the "Livingstone Declaration," endorsed by 38 out of 39 countries (South Africa, one of the continent's two producer states was the exception.) The strong political declaration is formally committing the African countries to the negotiations for a global cluster munitions ban treaty to be held in Dublin, Ireland, May 19-30, 2008. There was widespread support for a broad definition of cluster munitions to avoid exceptions based on so-called 'technical fixes,' and on the need for comprehensive liability provisions for the affected communities. The Dublin meeting should conclude the Oslo process and agree on the final terms and language of a cluster bombs ban treaty, which would then be opened for signature before the end of 2008. [See also *Negotiations Continue for an International Instrument to Ban Cluster Munitions* in November 2007 and other items on this issue in previous environmental security reports.] [April 2008. Military Implications, Sources]

Chemical Weapons Convention Gets New Boost

The Second Review Conference for the Chemical Weapons Convention was held in The Hague, April 7-18, 2008, attended by delegates from 114 of the 183 treaty states. The main issues brought up by participants were: threats posed by the use of chemical weapons by nonstate actors; deadlines for chemical weapons destruction (specifically named were Russia and the U.S., which have to destroy their chemical warfare agents by April 29, 2012, and Japan for destruction of its chemical weapons stockpiles in China); and universal adherence to the treaty. Delegates produced a report that reviews the treaty procedures and implementation issues, and urges the 12 countries that are not yet Party (Angola, the Bahamas, Dominican Republic, Egypt, Guinea-Bissau, Iraq, Israel, Lebanon, Myanmar, North Korea, Somalia and Syria) to join the international disarmament and nonproliferation treaty "as a matter of urgency and without preconditions." The report does not address the convention's relation to some new science and technology developments that could produce new threats—such as development of new incapacitating agents, advances in biology and nanotechnology, and industry verification mechanisms. It was proposed that, from now on, the Scientific Advisory Board of the Organization for the Prohibition of Chemical Weapons meet twice a year, not just once as it has previously. [See also *New Concerns Rising over Chemical Weapons* in April 2007 and other related items in previous environmental security reports.]

In the meantime, Pacific Consultants International warns that Japan is not on schedule for meeting its obligations towards China in the recovery and destruction of hundreds of thousands of chemical weapons abandoned at the end of World War II and will most probably not meet the April 2012 deadline, due to management problems. [See also *Japanese Chemical Weapons Cleaning in China Yet to be Completed* in June 2007, and other previous environmental security reports on this issue.] [April 2008. Military Implications, Sources]

NATIONAL/REGIONAL ENVIRONMENTAL STRATEGIES AFFECTING MILITARY ACTIVITIES

North American Environmental Security Action Plan

The 15th Regular Session of the Council of the Commission for Environmental Cooperation (CEC) was held June 25-26, in Ottawa, Canada. Key issues discussed included, *inter alia*: raising and harmonizing environmental standards across North America and effective enforcement of environmental law; reducing the risks of toxic substances to human health and the environment by improving chemicals management—implementation of SMOC (Sound Management of Chemicals) Program and of the North American Regional Action Plans, and improving border security by increasing the Parties' cooperation on intelligence sharing and operational support to combat the importation, use, and production of such products (the list of hazardous chemicals is being revised); energy security and reducing greenhouse gas emissions (by encouraging green technologies in building and motor vehicles industries and the establishment of Green Suppliers Partnerships); continuing cooperation for marine and biodiversity protection; and climate change expected impacts for North America and mitigation and adaptation challenges.
As a preamble to the meeting, the CEC prepared *North America 2030: An Environmental Outlook*, a succinct overview of the region's environmental stress factors and their trends. It includes a subchapter on environmental security, focusing mainly on the Northwest Passage, and food and energy security. A more detailed report on factors likely to impact North America's environment to 2030 is expected to be published later in 2008. These papers are intended to assist the CEC in developing its 2010–2015 Strategic Plan. [June 2008. Military Implications, Sources]

European Commission's New Low-carbon 20/20/20 by 2020 Energy Plan

The European Commission has proposed a package of measures to reach its "20/20/20 by 2020" targets — produce 20% of its energy from renewable sources and increase energy efficiency by 20%, cut greenhouse gas emissions by 20% of 1990 levels (or 30% in case of a global accord), and considerably reduce reliance on energy imports. The detailed roadmap includes specific renewable energy and CO_2 emission targets for each EU member state; new rules for carbon sequestration; and an updated Emissions Trading System for fair greenhouse gas emissions cuts for different emitters, with the aim of gradually including all industries in the emissions auction scheme. The Commission's proposals have to be endorsed by the European Council and Parliament, with the final package expected to come into force by the end of 2009. The European Commission hopes that the plan will trigger strong momentum towards a global agreement. Meantime, the European Commission is also considering introducing a climate tax on imports from states failing to tackle greenhouse gas emissions, and toughening EU's emission trading system. [See also *EU Energy and Climate Change Policy* in March 2007 environmental security report.] [January 2008. Military Implications, Sources]

EU Leaders Support the 20/20/20 Energy Plan

At the recent EU summit (March 13-14), member states' leaders indicated support for the EU's 20/20/20 energy plan. The package should receive full political backing by all governments by the end of 2008 in order to be discussed at the EU Parliament in the first week of 2009. In spite

of the tight deadline, EU officials are confident that the plan will pass in time to give the EU a better negotiating position at the December 2009 UN climate change summit. At the same time, despite some countries' disagreements and complaints, the European Commission reaffirmed that it is not willing to change the timetables and national targets. However: 1) some concessions were agreed for energy intensive industries such as steel and cement factories, which could get free pollution permits—instead of having to buy them by auction, and 2) foreign companies might also be made to take part in the emissions trading system (ETS). [March 2008. Military Implications, Sources]

Russian Focus on Environmental Security

Russia's new President Dmitry Medvedev said: "Our country is in a threatened state. If we don't deal with this [environmental matters], then in 10, 20, 30 years we could be in a situation where part of the country's territory is unfit for habitation…Ecology is a question of national security." [June 2008. Military Implications, Sources]

New Construction on Mediterranean Coastlines to be Banned

The recent meeting of the Barcelona Convention [for the Protection of the Marine Environment and the Coastal Region of the Mediterranean] added a new protocol on Integrated Coastal Zone Management to strengthen regional co-operation for harmonious and sustainable use of the Mediterranean coastal zone, including banning any construction within 100 meters (about 328 feet) to the water all along the Mediterranean shore. The participants also issued the Almería Declaration that requires all member states to catalog threatened marine species by 2011 and establish a network of protected coastal areas by 2012. To ensure that the convention's provisions are enforced, the first compliance system was established, and the parties agreed to create an enforcement committee. [See also *OSCE-NATO Workshop on Environmental Security in the Mediterranean* and *European Parliament Passed the Marine Strategy Directive* in December 2007 and other related items in previous environmental security reports.] [January 2008. Military Implications, Sources]

EU, Latin American and Caribbean Countries Environment Cooperation

The first meeting of the EU, Latin American, and Caribbean countries' environment ministers took place in Brussels, March 4, 2008, in a pre-meeting to the high level summit to be held in Lima, in May. More than two dozen environment ministers attended the meeting aiming to identify common priorities in order to increase environmental efforts and better integrate them in the EU–LAC countries' areas of cooperation. The focus was on collaboration strategies between the two regions for addressing climate change, renewable energy, biodiversity loss, and deforestation. The EU has already pledged considerable funds to help the region in domains such as natural resource management, renewable energy and energy efficiency, forest management, climate change mitigation, greenhouse gas reduction, carbon sequestration, and governance. [March 2008. Military Implications, Source]

US-Uruguay Treaty on S&T Cooperation

On April 29th the US and Uruguay signed a treaty to increase government, academic, business, and NGO scientific cooperation between the two countries. The agreement gives special

attention to the study of biodiversity to improve agriculture, medicine, and understanding of the impact of climate change on the environment. [May 2008. Military Implications, Source]

Iran and Iraq Sign Environment Protection Agreement

Iranian and Iraqi chief environment officials signed an agreement for increasing the two countries' cooperation in areas related to the environment. The eight-article document covers issues of natural resources, industrial and oil-exploitation pollution control, wildlife protection, and promoting ecotourism, as well as addressing environmental damage caused by wars. [January 2008. Military Implications, Source]

Israel to Participate in UNEP and UN HABITAT

The Western European and Others Group regional bloc within the UN elected Israel to represent the regional group in consultations with the UN Environmental Programme and the UN Human Settlements Programme (UN–HABITAT). This could create unique opportunities to address environmental security issues in the Palestinian territories, which are among the most severe in the world. [January 2008. Military Implications, Source]

Waste Disposal a Matter of Discord or Cooperation between Palestine and Israel

Waste disposal might additionally fuel the increasingly tense relations between Israel and the Palestinian Authority as waste is transferred from Israel to areas of the West Bank. The main problem is that large quantities of building waste are deposited in pirate sites near Palestinian villages. Some contain toxic substances polluting the environment, leaking into the water system, and endangering the public health of both Palestinian and Israeli people. Scientists and environmentalists call on the two parties to leave aside diplomatic disagreements and develop collaborative relations on environmental issues generally and on solving the waste problem specifically. [March 2008. Military Implications, Source]

China's New Ministry of Environmental Protection

China announced the creation of five new "super ministries": Ministry of Industry and Information, Ministry of Human Resources and Social Security, Ministry of Environmental Protection, Ministry of Housing and Urban-Rural Construction, and Ministry of Transport, and a ministerial-level national energy body to oversee energy policy across all ministries. Establishing the new environment ministry is intended to help tackle China's growing pollution problems. Environmental monitoring and law enforcement will be high priorities, said future minister of environmental protection, Zhou Shengxian, at the 2008 National Environmental Law Enforcement Conference. [March 2008. Military Implications, Source]

Environmental Courts Established in the Philippines

The Philippine Supreme Court has designated 117 trial courts as 'environmental courts' to hear cases involving violations of laws protecting the country's natural resources and to speed up their resolution. [January 2008. Military Implications, Source]

Nigerian Government Resolves to Push Effective Environmental Enforcement

On the occasion of a visit from a UK Environment Agency team, the director-general of the Nigerian National Environmental Standards and Regulations Enforcement Agency (NESREA) stated the government's increased commitment to ensure a cleaner and healthier environment for Nigerians through effective enforcement of environmental laws. [February 2008. Military Implications, Source]

TECHNOLOGICAL BREAKTHROUGHS WITH ENVIRONMENTAL SECURITY IMPLICATIONS

Computer Technology and Robotics

Google to Support Development of Early Warning System in Vulnerable Regions

Google.org, the philanthropic arm of Google Inc., unveiling its charity plan over the next five to ten years, announced $25 million in grants aimed at addressing global challenges. One of the five core initiatives, 'Predict and Prevent' aims to empower communities to predict and prevent ecological, health or social crises before they become local, regional, or global crises, by identifying 'hot spots' and enabling rapid response. InSTEDD (Innovative Support to Emergencies, Diseases and Disasters) is allocated $5 million to improve early detection, preparedness, and response capabilities for global health threats and humanitarian crises. Other recipients in this category include the Global Health and Security Initiative (GHSI) and Clark University. [January 2008. Military Implications, Sources]

New Detection and Cleanup Techniques

Nanotube-based Biosensor Sensitive to Trace Amounts
Emerging Contaminants: Most Effective Treatment Strategies
Nanowire "Paper" Selectively Absorbs Oils in Water
Carbon-gold Nanoparticle Sacs Trap Oil Droplets
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Chemical Agent Cleanser Developed in Canada
Animal-Robot Team Effective for UXO Clearance
Miniature Chemical Agent Sensor
New Rapid Portable Chemical Sensor
Model Helps Evaluate Performance of Biosensors
Reusable Carbon Aerogel Adsorbs Organic Solvent Pollutants
Water Purification Techniques
New Approach May Ease Uranium Decontamination
New Material Strips out Radioactive Debris
New Type Nanoscale Transistor Would Aid DNA Detectors
Chemical Tests on Cells Rather than Animals

Nanotube-based Biosensor Sensitive to Trace Amounts

Early Warning Inc. of Troy NY has licensed from NASA's Moffett Field Ames Research Center technology for a nanotube-based biosensor sensitive to trace amounts of specific bacteria, viruses and parasites. According to a company release, "The biosensor works when a single strand of nucleic acid comes into contact with a matching strand of nucleic acid attached to the end of an ultra-conductive nanotube. The matching strands form a double helix that generates an electrical signal, which is used to determine the presence of specific microorganisms in the sample. Because of their tiny size, millions of nanotubes can fit on a single biosensor chip allowing identification of very low levels." [May 2008. Military Implications, Sources]

Emerging Contaminants: Most Effective Treatment Strategies

Endocrine disruptor chemicals (EDCs) and pharmaceuticals and personal care products (PPCPs) have been discussed as emerging issues for water supply and wildlife protection for more than a decade. The American Water Works Association's (AWWA) May 2008 Opflow carries an article describing three processes for treating these substances in public water supplies. Additionally, AWWA has added a special session to its June 8-12, 2008 annual conference in Atlanta, Georgia. Taken together, these indicate that public and water industry interest in remedial action has run ahead of legislation and regulation – leaping over at least one of the common four steps through which an issue progresses in evolving from a scientific discovery to become a societal action item. The three processes discussed in the article are: additional processing of wastewater effluents, reverse osmosis treatment of potable water, and combined ultraviolet/reverse osmosis treatment of potable water. [May 2008. Military Implications, Sources]

Nanowire "Paper" Selectively Absorbs Oils in Water

Prof. Francesco Stellacci, of MIT's Department of Materials Science and Engineering, and colleagues have developed a paper-like membrane comprising a mat of potassium manganese oxide nanowires. The new (and inexpensive) material is completely impervious to water but can absorb up to 20 times its weight in oil or other hydrophobic substances, and can be recycled indefinitely often by heating it to evaporate the oil. [June 2008. Military Implications, Source]

Carbon-gold Nanoparticle Sacs Trap Oil Droplets

Rice University's Pulickel Ajayan, Professor of Mechanical Engineering and Materials Science, and his research team have developed carbon-gold segmented nanowires that assemble to form BB-sized sacs around droplets of oil in water. [June 2008. Military Implications, Source]

More New Improvements in Nanotube-based Environmental Sensors

In a paper published in the online edition of *Angewandte Chemie*, Michael Strano, Associate Professor of Chemical Engineering at MIT, and his team describe a new highly sensitive technology for detecting gases in the environment. The system consists of carbon nanotubes, whose conductivity selectively changes when a gas binds to them, coupled with a miniature gas-chromatography column etched onto a silicon chip. The column separates the different gases in the environment before they reach the nanotubes, to achieve a sensitivity of 25 parts/trillion. A further improvement adds a coating to the tubes which causes the gas molecule to detach a few

milliseconds after attaching, allowing the movement of the triggering component to be tracked as it moves. [June 2008. Military Implications, Source]

Chemical Agent Cleanser Developed in Canada

A new non-toxic method for rapidly and safely destroying toxic agents, such as chemical weapons and pesticides, has been developed by researchers from Queen's University, Canada. The alcohol-based system is non-corrosive, acts within minutes, and proved to be more than 99% effective in eliminating organophosphorus agents, such as Tabun, Soman and VX. It might represent a safe and environmentally friendly option for destroying stockpiles of chemical weapons, environmental spill cleanup, and rapid response to possible terrorist attacks using chemical weapons agents. It is safe in most conditions and has no special storage requirements. [April 2008. Military Implications, Sources]

Animal-Robot Team Effective for UXO Clearance

Animal-robot teams can be a safe and efficient alternative for post-conflict area scanning and clean-up. A remotely controlled robot leading a dwarf mongoose (Helogale parvula) trained to sniff out explosives is an approach demonstrated by Thrishantha Nanayakkara and colleagues at the University of Moratuwa in Sri Lanka. The group APOPO in Tanzania has been training Gambian giant pouched rats for similar manually-led operations, but the robot guidance eliminates the human risk factor. The two animals mentioned are more easily trained and perform better than dogs. [April 2008. Military Implications, Sources]

Miniature Chemical Agent Sensor

Gas chromatography and mass spectrometry devices for detection of various dangerous gases are being further reduced in size, while their sensitivity and rapidity of reaction is increasing. The prototype of a new tiny device produced results in about four seconds from minimal gas amounts and operates on limited amounts of power. The sensor, developed by researchers from MIT, Cambridge University, University of Texas at Dallas, Clean Earth Technology and Raytheon, is expected to be completed in the next two years. [January 2008. Military Implications, Sources]

New Rapid Portable Chemical Sensor

Guardion-7, a 28-pound, briefcase-sized unit is a portable chemical sensor that can identify nerve agents, explosives and other substances within five minutes, with high accuracy, even in extreme climates, apparently without false-positive readings found in current sensors. It was developed by Brigham Young University scientist Milton Lee and has been successfully tested at the Dugway Proving Ground in Utah. The U.S. Defense Threat Reduction Agency certified its accuracy in February. Research continues to make the device even smaller and lighter. [March 2008. Military Implication, Source]

Model Helps Evaluate Performance of Biosensors

A new modeling technique allows the study of miniature biosensors used to identify pathogens, DNA or other substances. The technique, developed by scientists of the School of Electrical and Computer Engineering at Purdue University, comprises a new conceptual framework and

corresponding computational model to relate the shape of a sensor to its performance and explain why certain designs perform better than others. [January 2008. Military Implications, Sources]

Reusable Carbon Aerogel Adsorbs Organic Solvent Pollutants

A monolithic carbon aerogel that will adsorb organic solvent pollutants such as benzene, toluene and xylene, and that can be easily regenerated and used repeatedly has been produced by David Fairén Jiménez and other researchers at the Univ. of Granada in Spain. [March 2008. Military Implications, Source]

Water Purification Techniques

Researchers at the University of Nottingham have developed a technique that uses bacteria to consume contaminants that build up on the membranes used in some water purification systems. This allows the filters to be cleaned within the closed system, without removing the membranes. In another advance, researchers at the University of South Australia have developed a low cost, efficient technique for removing organic material from water. It involves the use of silica particles coated with a nanometer-thin layer of active material based on a hydrocarbon with a silicon-containing anchor. The coated particles are stirred in the contaminated water for up to an hour and the powder is then filtered out. [February 2008. Military Implications, Sources]

New Approach May Ease Uranium Decontamination

A new technique may lead to methods for removing dissolved uranium (e.g., from depleted uranium munitions) from liquids, such as groundwater. The method uses large organic molecules called macrocycles that essentially envelop a uranyl ion ($(UO_2)^{2+}$), leaving one of its oxygen atoms exposed, showing that the normally strong bond between the uranium and oxygen has been weakened. The scientists, Polly Arnold and Jason Love of the University of Edinburgh, believe "that the uranyl ion's bonds can be loosened is a first step towards finding substances that can transform dissolved uranyl into an insoluble compound." The macrocycle is destroyed by water, so further work will be necessary to produce a practical decontamination technique. [January 2008. Military Implications, Sources]

New Material Strips out Radioactive Debris

Scientists at the U.S. Department of Energy's Argonne National Laboratory and Northwestern University developed a layered sulfide compound, which very efficiently strips out radioactive strontium-90 from nuclear waste. They are now experimenting with the compound's ability to isolate such other common radioactive elements as cesium and uranium. [March 2008. Military Implications, Source]

New Type Nanoscale Transistor Would Aid DNA Detectors

A mathematical simulation developed by Samuel Afuwape of National University, in San Diego, helps to design a new type of nanoscale transistor for a portable DNA detector for testing contaminated sites. The new nanoscale ion-selective field-effect transistor (ISFET) could be integrated into a biosensor containing thousands of DNA sequences that would bind with DNA sequences in a sample, producing changes in conductivity detectable by the ISFET. The

miniature DNA detector would have broad application, including bioweapons detection. [March 2008. Military Implications, Source]

Chemical Tests on Cells Rather than Animals

The U.S. Environmental Protection Agency, the NIH Chemical Genomics Center, and the National Institute of Environmental Health Sciences have announced collaboration to change how chemicals are tested for risks they pose to humans. The agencies will research and implement a new approach that will move away from traditional animal testing and toward tests that use cells. The approach is explained in the National Research Council's 2007 report *Toxicity Testing in the 21st Century: A Vision and a Strategy*. [February 2008. Military Implications, Sources]

Technologies that Could Trigger New Forms of Arms Race

Future Proliferation of Autonomous Ground and Air Robot Weapons

Although today's robotic weapon systems include humans in decisionmaking, future autonomous systems may be developed by major military powers to act without human intervention. This technology could be relatively easy to build and at relatively low costs, making proliferation possible. One robotics expert has called on national governments and the international community to assess these risks and seek controls before they become more commonly available. [February 2008. Military implications, Sources]

Promising Environmental-friendly Technologies

All-Electric cars coming from Norway and China with More than Hundred Mile Ranges
New Solar Cell Design Raises Efficiency
New Lithium-ion Battery Offers Multiple Advantages
Improved Solar Cell Promised in a Year
New Inter-electrode Material Yields 50% Fuel Cell Power Increase
Formic Acid Provides New Fuel Cell Medium
New Insight into Methane-converting Catalyst
New Low Power Chip Suitable for Tiny Environmental Sensors
New Material for Storing Hydrogen
New Capacitor Promises 100× Improvement over Batteries in Charge/Weight Ratio
Bacteria-Generated Electricity from Waste to Power Fuel Cell
New Sunshine Distribution System Provides Energy-free Lighting
Converting CO2 into Fuels using Sunshine
New Project for Nanowire Solar Cells
NanoRadio Offers Low Impact Environmental Monitoring and Communications
New Technique Might Power Nano-based Environmental Devices
Ionic Liquids Provide Safe Alternative to Mercury

All-Electric cars coming from Norway and China with More than Hundred Mile Ranges

An all-electric car is expected to be available for purchase next year (2009) in the U.S.; it is called "Think City" from Think North America, a Norwegian-California joint venture startup. The car runs on sodium or lithium batteries and can travel up to 110 miles on one charge. In 3-5 years BYD Auto Co. of Shenzhen, China, plans to market its all-electric car in the U.S. with a 185-mile range on a single full charge. [April 2008. Military Implications, Sources]

New Solar Cell Design Raises Efficiency

Prof. Ely Sachs and colleagues at MIT have developed a solar cell design that offers a 27% increase in efficiency over existing devices. They predict that the cells' present cost of $1.85/watt can be reduced to about $1.35/watt. The new multi-crystalline silicon cells embody several improvements, which increase the amount of light reaching the active elements in the cells. Commercialization of the development is being done by 1366 Technologies. [See also *New Project for Nanowire Solar Cells* in January 2008, *Reducing Military Footprint with Solar Energy at 30 Cents per Watt* in November 2007, and other similar items in previous environmental security reports.] [April 2008. Military Implications, Sources]

New Lithium-ion Battery Offers Multiple Advantages

A123 Systems of Watertown MA developed a new lithium-ion battery design with significant advantages for demanding mobile applications, such as electric vehicles and portable electronic devices. The new units feature greatly increased safety (not bursting and igniting, when overheated or damaged), longer life, and greater energy capacity, stemming from an innovative electrode material that contains nanoparticles of lithium iron phosphate modified with trace metals. [May 2008. Military Implications, Sources]

Improved Solar Cell Promised in a Year

SUNRGI Company announced the development of a solar cell technology which they say will deliver power at 7¢/kWh, around the price of coal-fired energy. Their panels use lenses to concentrate sunlight, and a proprietary cooling system to prevent consequent cell damage from heating. Start of production is scheduled for mid-2009. IBM has also released details on a similar technique. [May 2008. Military Implications, Sources]

New Inter-electrode Material Yields 50% Fuel Cell Power Increase

MIT Professor Paula T. Hammond and her team produced a new thin film material for the membrane separating the electrodes in direct methanol fuel cells. The current material is not impervious to methanol leakage across the boundary. Applying the new film produced a 50% gain in power output from the cell. Drexel University chemical engineering professor Yossef Elabd had earlier investigated the leakage mechanism in the present membranes, and produced several other alternatives. [May 2008. Military Implications, Sources]

Formic Acid Provides New Fuel Cell Medium

Matthias Beller and colleagues at the Leibniz Institute for Catalysis, in Rostock, Germany have developed a technique to convert formic acid into hydrogen at low temperatures (26°C to 40°C).

The new process is suitable for low-power fuel cell applications, like mobile electronic devices, rather than for vehicle usage. It does not require a high-temperature steam reforming unit, as methanol does (instead, it is converted to hydrogen by a ruthenium-based catalyst) and its power/weight ratio is only one-third that of methanol. [May 2008. Military Implications, Source]

New Insight into Methane-converting Catalyst

New work reported by the International Consortium for Clean Energy, a collaboration among DOE's Pacific Northwest National Laboratory, the Chinese Academy of Sciences' Dalian Institute of Chemical Physics, and China's Institute of Coal Chemistry, sheds light on the optimum structure for a catalytic material, molybdenum oxide on a zeolite substrate, which can turn methane into benzene. [May 2008. Military Implications, Source]

New Low Power Chip Suitable for Tiny Environmental Sensors

The new Phoenix Processor, developed by Scott Hanson and Mingoo Seok at the Univ. of Michigan's Dept. of Electrical Engineering and Computer Science, uses just 30 picowatts in sleep mode and only 90 nanowatts in active mode. The chip measures 1 mm^2, the same as its battery, which can be so small because of the low power requirement. The small size means that the sensors using the chip could be scattered around in an environment-sensing network. The chip contains a built-in low power timer that causes it to run on a 0.1 sec/10 min awake cycle, suitable for sensing applications. [June 2008. Military Implications, Source]

New Material for Storing Hydrogen

Physicists Adam Phillips and Bellave Shivaram of the University of Virginia have found a new class of materials, transition metal-ethylene complexes, which may offer a much more efficient way of storing hydrogen for fuel cell applications than previous substances. An example uses titanium with an ethylene nanostructure, which their measurements indicate will hold 12% by weight of hydrogen, more than twice the target of 5.4% set by DOE to support the development of hydrogen fuel cell vehicles. [April 2008. Military Implications, Source]

New Capacitor Promises 100× Improvement over Batteries in Charge/Weight Ratio

Lockheed Martin has signed an agreement with EEStor of Cedar Park, Texas for the military applications of a new type of ultracapacitor based on barium titanate that Lockheed Martin believes will be able to hold 10 times the energy in 1/10th the weight of typical batteries. [January 2008. Military Implications, Source]

Bacteria-Generated Electricity from Waste to Power Fuel Cell

Microbial fuel cell technology, being developed by scientists from Arizona State University's Biodesign Institute, is based on the use of bacteria to convert a variety of liquid organic waste (such as sewage or pig manure) into electricity. [January 2008. Military Implications, Source]

New Sunshine Distribution System Provides Energy-free Lighting

The Solatube system collects sunlight from a rooftop unit and distributes it to interior spaces through specially designed optical tubes, eliminating the need for external power for illumination when daylight is sufficient. [January 2008. Military Implications, Sources]

Converting CO_2 into Fuels using Sunshine

The Sunlight to Petrol (S2P) project developed by researchers at Sandia National Laboratories in New Mexico is using sunlight to convert CO_2 into fuels like methanol or gasoline. Although the innovation seems to be working, large-scale implementation could take 15-20 years to reach industrial scale. [January 2008. Military Implications, Sources]

New Project for Nanowire Solar Cells

The Department of Engineering Physics at McMaster University in Hamilton ON, Cleanfield Energy, and the Ontario Centres of Excellence (OCE) have formed a partnership for a three-year project to pursue the commercialization of nanowire technology in the production of more affordable solar cells. [January 2008. Military Implications, Source]

NanoRadio Offers Low Impact Environmental Monitoring and Communications

Prof. Alex Zettl of the Univ. of California's Berkeley Nanosciences & Nanoengineering Institute and his group have developed a nanoscale radio, in which the key circuit consists of a single carbon nanotube. This work derived from an effort to create inexpensive wireless environmental sensors. [April 2008. Military Implications, Source]

New Technique Might Power Nano-based Environmental Devices

Researchers at the Georgia Institute of Technology have developed a microfibre–nanowire hybrid structure for energy scavenging. According to the abstract, "Solar, thermal and mechanical (wind, friction, body movement) energies are common and may be scavenged from the environment", and the Editor's Summary describes their work as "a system that converts low-frequency vibration/friction energy into electricity using piezoelectric zinc oxide nanowires grown radially around textile fibres. By entangling two fibres and brushing their associated nanowires together, mechanical energy is converted into electricity via a coupled piezoelectric-semiconductor process. This work shows a potential method for creating fabrics which scavenge energy from light winds and body movement." [February 2008. Military Implications, Source]

Ionic Liquids Provide Safe Alternative to Mercury

Robin Rogers of Queen's University, Belfast, UK, and his colleagues have discovered that ionic liquids (IL)—salts in liquid form—are an environmentally safe substitute for mercury in thermometers. Gary Baker, of the Oak Ridge National Laboratory in the U.S., also points out that ILs are potentially green replacements for conventional solvents in other applications. [March 2008. Military Implications, Source]

B Preventing or Responding to Environmentally Caused Conflicts

SECURITY IMPLICATIONS OF CLIMATE CHANGE

Increased Role of the Military in Environment-related Crises

Senior security policy-makers from 27 countries attended this year's Shangri-La Dialogue in Singapore May 30–June 1, 2008 to improve military anticipation and response to natural disasters such as those of last year in Bangladesh and this year in Myanmar. Ministers from ASEAN recognized that diverging views on military involvement should be addressed. A French politician suggested that a system of sanctions should be established to "stop this scandal of having hundreds of thousands of people dying with help waiting outside and having a lecture about non-interference in domestic affairs," and that he will advise the French government to propose that Myanmar government be held liable before the International Criminal Court. Singapore's Prime Minister Lee Hsien Loong made a few recommendations for addressing climate change, including establishing a 'technology transfer board' for helping the LDCs, and an International Food Fund to address food security. "Between countries, competition for food supplies and displacement of people across borders could deepen tensions, and provoke conflict and wars" he said. [June 2008. Military Implications, Sources]

International Security Responses to a Climate Changed World

Delivering Climate Security: International Security Responses to a Climate Changed World, by Nick Mabey, published by Britain's Royal United Services Institute for Defence and Security Studies, outlines a framework for climate security analysis and some of its implications for security policy, practice and institutional change. Noting that international response to climate security threats has been 'slow and inadequate', it recommends that nations integrate climate change into their security policy to prepare for worst-case scenarios. Otherwise, says the author, climate change might have security implications of "similar magnitude to the World Wars, but which will last for centuries." [April 2008. Military Implications, Sources]

National Security Implications of Global Climate Change Through 2030

National Security Implications of Global Climate Change Through 2030 by the National Intelligence Council, is an assessment of climate change security implication for the US in the next 20 years. It is a comprehensive assessment of the impact of climate change in different parts of the world and the possible political instabilities, mass movements of refugees, terrorism, or conflicts over water and other resources in specific countries. The next effort is a scenario exercise and the third effort will be to explore the geopolitics of climate change and how that may shift the relationships between major powers. NIC's Global Trends out to 2025 is expected to be published in December 2008. [June 2008. Military Implications, Sources]

An Uncertain Future: Law Enforcement, National Security and Climate Change

An Uncertain Future: Law Enforcement, National Security and Climate Change is a comprehensive analysis of the security implications of climate change, including some

recommendations. It warns that "traditional attempts to maintain the status quo and control insecurity" and use "military force to secure resources overseas, while attempting to create a fortress state at home" are doomed to failure. Mentioning "almost certain" future mass movement of 200 million people by 2050 due to climate change, the report calls for an international legal framework for environmental refugees' management. Climate change has the potential to change the geographical and political world map and in addition to being a "threat multiplier" in already vulnerable areas like the Horn of Africa and the Persian Gulf, it could also cause civil unrest in developed countries of North America and Europe. Increased research is needed to identify areas of highest vulnerability and instability and to consider climate change in foreign aid programs. Military and police will have to change from reactive to proactive strategies in order to prevent and manage security issues triggered by climate change. Unrest could range from protests against polluting companies and government inaction to new forms of ecoterrorism (although the author considers the term misleading).
Recommendations include changes in "Policing new legislation" and "important operational and strategic concerns that military planners will need to consider over the coming decades:
1 Difficulties maintaining military capability; 2 Loss of strategic defence assets; 3 Greater calls for peacetime deployments; 4 Instability in strategically important regions." A whole chapter covers "Implications for National Security and the Military", including "Difficulties maintaining military capability; Loss of strategic defence assets; Greater calls for peacetime deployments; and Instability in strategically important regions." The report concludes: "The risks of climate change demand a rethink of approaches to security."
The report is authored by Chris Abbott of Bristol University's Centre for Governance and International Affairs, published by Oxford Research Group "building bridges for global security." [January 2008. Military Implications, Sources]

Security Implication of Climate Change to the EU

Climate Change and International Security. Paper from the High Representative and the European Commission to the European Council analyses the security implications of climate change in general and with specific implications to the EU, and makes some recommendations for EU policies. It reviews the main categories of threats posed by climate change to security (Conflict over resources; Economic damage and risk to coastal cities and critical infrastructure; Loss of territory and border disputes; Environmentally-induced migration; Situations of fragility and radicalization; Tension over energy supply; and Pressure on international governance) and then addresses vulnerabilities by specific regions (Africa; Middle East; South Asia; Central Asia; Latin America and the Caribbean; and The Arctic). The report concludes that "The impact of climate change on international security is not a problem of the future but already of today and one which will stay with us" and underlines that the European Security Strategy and related proposals "should take account of the security dimension of climate change." Some specific recommendations include "Focus attention on the security risks related to climate change in the multilateral arena; in particular within the UN Security Council, the G8 as well as the UN specialised bodies (among others by addressing a possible need to strengthen certain rules of international law, including the Law of the Sea)," capacity building from detection to adaptation, addressing migration issues, and adapting cooperation with other countries to the new realities induced by climate change. [March 2008. Military Implications, Sources]

UNEP's Year Book 2008

UNEP's Year Book 2008 highlights the impacts of global warming (from the melting of permafrost and glaciers to extreme weather events), also showing the changes in policies and actions of leaders of governments, companies, and the UN itself in addressing issues related to climate change. It shows that business begins to see climate change as an opportunity rather than a burden, as a growing numbers of companies embrace environmental policies and investments in clean technology and renewable energies are increasing. [February 2008. Military Implications, Sources]

Twenty Years of Environmental Security

An Uncommon Peace: Environment, Development, and the Global Security Agenda by Geoffrey D. Dabelko, ECSP Director, published on the 20th anniversary of *Our Common Future* (commonly known as the Brundtland report) is an assessment of the evolution of our understanding of environmental concerns with implications for national and international security. It addresses changes in the traditional state-centered approach to new security threats such as: the possible environmental consequences of nuclear war replaced by the increased threat of dirty bombs; new threats such as genetic mutations; and health and poverty. Dabelko notes that these new realities outline the pathway to "one facet of our common future: environmental peacemaking." [May 2008. Military Implications, Source]

Recommendations for Addressing U.S. Environmental Security

Insecure About Climate Change is an essay summarizing a recent special report for the Council on Foreign Relations, *Climate Change and National Security: An Agenda for Action*. It makes some specific recommendations to "strengthen national security by reducing U.S. vulnerabilities to climate change at home and abroad," such as: establishing a new "deputy undersecretary of defense position for environmental security [emphasis added]… to redress the insufficient institutionalization of climate and environmental concerns in the Department of Defense; … several senior positions in the National Security Council dedicated to environmental security" and eventually a "special advisor to the president on climate change with some budgetary authority." The author also makes some financial suggestions to help developing countries prepare for climate change, "including $100 million (over several years) for military-to-military environmental security workshops; …another $100 million per year to support an African Risk Reduction Pool" as "part of a broader international risk reduction effort that… should be on par with the president's five-year, $15 billion emergency plan for AIDS relief." The author of the essay and report, Joshua Busby, is assistant professor at the LBJ School of Public Affairs at the University of Texas at Austin and fellow with the Robert S. Strauss Center for International Security and Law. [March 2008. Military Implications, Sources]

Arctic Debate

Arctic Debate Update

Less than one month after the five Arctic countries agreed at the summit to follow the Law of the Sea in resolving the Arctic disputes, Russian Lt. Gen. Vladimir Shamanov, head of the Defense Ministry's combat training directorate said that Russia started the revision of their military

training program to be prepared for fast deployment in "the Arctic in case of a potential conflict." He invoked the "reaction of a certain number of heads of state to Russia's territorial claims to the continental plateau of the Arctic" and the large-scale U.S. Northern Edge 2008 military exercise conducted in Alaska in late May. [June 2008. Military Implications, Sources]

Arctic Disputes Continue

An authoritative report, *Climate Change and International Security*, to the European Council, among other recommendations for addressing security issues in the new context of climate change, recommends "Develop an EU Arctic policy based on the evolving geo-strategy of the Arctic region, taking into account i.a. [inter alia] access to resources and the opening of new trade routes." It notes, "The increased accessibility of the enormous hydrocarbon resources in the Arctic region is changing the geo-strategic dynamics of the region." A recent U.S. survey revealed that the Alaska continental shelf might extend more than 100 nautical miles farther from the U.S. coast than previously assumed, therefore eventually giving the U.S. the right to claim access to extra seabed resources if it were party to the Law of the Sea treaty. In the meantime, the US-based Arctic Oil & Gas Company has filed a claim with the UN to act as the sole "development agent" in the Arctic region, with exclusive rights to extract oil and gas from the central Arctic Ocean currently beyond the territorial control of the polar nations. [March 2008. Military Implications, Sources]

Arctic Issues Still at the Debate Stage

Officials from the Arctic coastal countries Canada, U.S., Russia, Denmark, and Norway met in Ilulissat, Greenland, May 27-29, 2008, to address issues related to the Arctic territory. The meeting concluded with The Ilulissat Declaration, by which the five nations reaffirm their commitment for applying the UN Law of the Sea "to the orderly settlement of any possible overlapping claims," stipulating that there is "no need to develop a new comprehensive international legal regime to govern the Arctic Ocean." Critics say that this opens the possibility for a polar "carve up" by the five countries. Other Arctic Council group nations (Sweden, Iceland and Finland) as well as the indigenous communities—who are the majority of the population within the Arctic Circle—were not invited to the meeting. Environmentalists and the indigenous groups call for an international treaty similar to the one for Antarctica, which bans all military activity and mineral exploitation. A UN panel is supposed to rule on Arctic control by 2020. By the Ilulissat Declaration, the Arctic coastal nations also agree to cooperate on scientific research, improving navigation safety, and development of environmental monitoring and disaster response systems.

However, there is speculation that Russia has the strongest position for increasing its influence in the region and support for its expansion claims. It has infrastructure along the North Sea Route (including ports), has for a long time performed extensive research and possesses essential knowledge about the region. Most of all, Russia has the most powerful fleet and military potential permanently deployed in the Arctic. Russia is also working on gathering more evidence to support its claim for territorial expansion under the Law of the Sea. [May 2008. Military Implications, Sources]

MIGRATION TRIGGERED BY ENVIRONMENTAL CAUSES

Number of People of Concern Rising

The United Nations High Commissioner for Refugees stated that the number of people of concern rose for the past two years. One of the factors cited was climate change making resources scarcer. UNHCR's *2007 Global Trends* reports that the number of international refugees rose from 9.9 million to 11.4 million by the end of 2007, while the number of internally displaced people increased from 24.4 million to 26 million. As conflict and environmental degradation exacerbate each other, unless adequately addressing the situation in its whole complexity, forced displacement will continue to rise. The most at risk are the already vulnerable areas of Africa and the Indian sub-continent. [June 2008. Military Implications, Sources]

Population Trends and Environmental Impact

Kyrgyzstan's Deforestation Threatens Central Asia's Security

The Kyrgyz government's Agency for Environmental Protection and Forestry and environmentalists have issued warnings about the country's rate of deforestation and its consequences. It is estimated that over the past 50 years, half of the forest cover was lost, and illegal logging continues at a rate about at par with the legal one, maintained by corruption and the population's low living standard. Kyrgyzstan forests are crucial for the whole Central Asian ecosystem, their disappearance causing water scarcity, health problems, and more frequent natural disasters such as floods, landslides and droughts. Experts demand better enforcement of international environmental regulations to which the country is party. [See also *UN General Assembly Adopts Global Forest Agreement* in December 2007 and *Environment and Security Program in the East-Caspian Region* in September 2007, *Network of Environment Centres in Central Asia* in February 2004, and *Prospective International Agreements for Mountain Regions* in October 2002 environmental security reports.] [March 2008. Military Implications, Source]

NATURAL DISASTERS

Scientific evidences and possible consequences

The Northern hemisphere spring of 2008 was the seventh warmest on record, nearly one degree warmer than the 20th century average, according to the National Climatic Data Center. It was also marked by weather extremes around the world: Cyclone Nargis which devastated Myanmar (Burma); record low spring snow in Europe and Asia; severe drought in China; North America devastated by strong storms, flooding, tornadoes (reported number for half-year exceeding 10-year annual average) and drought (in the West); and the first two big tropical storms hitting Central America. Meantime, Australia's fall is unusually dry, aggravating the drought in many parts of the country. [June 2008. Military Implication, Sources]

The number of people affected by natural disasters in 2007 reached 200 million, considerably higher than the135 million in 2006, according to the annual study by the Belgian research center Centre for Research on the Epidemiology of Disasters (CRED) of the Catholic University of

Louvain. Except for the August earthquake in Peru, the ten deadliest disasters were all climatic, with flooding affecting the most people and being the deadliest. Asia was the region most touched by climatic disasters, but overall, the U.S. experienced the highest number of natural disasters (22), ahead of China (20) and India (18).

Heavy rains for several weeks caused heavy flooding in Zambia, Mozambique, Zimbabwe and Malawi, displacing thousands of villagers and devastating the largely agriculture-based economies of the region. The UN noted that the Mozambique floods could be the worst in memory.

Australian meteorologists suggest that the country's weather patterns are changing and that stronger storms, droughts, and higher temperatures might become the norm. Statistics show that 2007 was the warmest year on record for New South Wales and the Murray-Darling Basin, and the 11th year in a row experiencing above normal temperatures and the 7th with below-average rain, with the southeast of Australia facing the worst drought in living memory. [January 2008. Military Implication, Sources]

Tens of thousands of people died and hundreds of thousands lost everything in Myanmar as tropical cyclone Nargis hit the Southeast Asian country, also known as Burma. The tragedy was increased by the lack of preparedness and response capability of the country and the ban on intervention by foreign aid agencies.

Although there is no consensus on linking storms' number and strength to climate change, some experts say that there is evidence of a probable trend that storms are becoming more powerful as global warming heats up the oceans. Professor Kerry Emanuel, an MIT meteorologist says that the power of tropical cyclones has roughly doubled since the 1950s, with the most increase occurring over the last three decades, consistent with man-made global warming.

Considering the rate so far, 2008 might be the year with the most tornadoes in the U.S. since 1950—when modern recordkeeping began—and the deadliest in a decade, reports The Weather Channel. In some states, the number to date of such storms already exceeds the yearly average: Mississippi had 49 tornadoes compared to an annual average of 39 twisters average; Alabama 45 versus 42, and Arkansas 49, compared to 48. [May 2008. Military Implication, Sources]

Scientists have detected dilution in salinity of the sea around Antarctica and warn that this could have significant effects on the world's climate and ocean currents. The so-called Antarctic bottom water of this region controls the system of ocean currents spanning the Southern, Pacific, Indian and Atlantic Oceans that shift heat around the globe. The phenomenon might be due to global warming, and jn its turn will influence climate change.

For the past 20 years, no significant correlation can be established between climate change and the Sun's activity, found UK Lancaster University scientists, using three different research methods. The findings support the assessment of the Intergovernmental Panel on Climate Change that man-made greenhouse gas emissions outweigh solar activity variations as a cause of global warming.

Climate change-induced effects might prove costly for the US. Although there is no consensus on the link between global warming and the number of hurricanes, scientists agree that climate change could increase storms' damaging forces. The National Hurricane Center estimates that the US might be hit by a hurricane that could cause more than $100 billion in

damage. Highly populated coastal areas are at highest risk. A category 5 hurricane could produce at least $140 billion in damage to South Florida. [April 2008. Military Implication, Sources]

A comprehensive study conducted by an international research team from 10 institutions around the world, led by NASA's Goddard Institute for Space Studies, found conclusive evidence of the link between human-caused climate change and the trends of change of Earth's natural systems. The research analyzed a database of more than 29,000 data series of physical and biological systems, and natural phenomena, on land and in water, with at least 20 years of records between 1970 and 2004. In about 90% of the cases from North America, Europe, and Asia, a link could be established between warming and changes of the systems' patterns or behavior. The results for Africa, South America, and Australia are not conclusive, due to lack of enough historical scientific data.

Scientists from Switzerland, France and Germany, working on the European Project for Ice Coring in Antarctica, found that "today's concentrations of carbon dioxide and methane are 28% and 124% higher respectively than at any time during the last 800,000 years," increasing the likelihood that human activity is a cause of climate change.

Chinese and Australian scientists are examining possibilities for deeper drilling in parts of Antarctica to find atmospheric records dating back 1.5 million years.

The Living Planet Index reveals dramatic biodiversity reduction since 1970: land species have declined by 25%, marine life by 28%, and freshwater species by 29%. Scientists estimate the current extinction rate being 10,000 times faster than the historical rate. The main causes of species decline are consequences of human behavior: climate change, pollution, destruction of animals' natural habitat, spread of invasive species, and overexploitation of species.

The Arctic is warming at about twice the global average and the changes of climate and moisture highly impact the region's vegetation, with possible negative consequences that will further influence global climate. The tundra is shrinking due to the expansion to the north of the boreal forests, which creates large dark surfaces that will absorb—instead of reflecting— solar heat. Reduced moisture increases wild fire potential in the tundra (in 2007, about 250,000 acres of Alaskan tundra burned), further improving the conditions for forest expansion. However, due to likely future drought in the region, the death of trees will be releasing carbon into the atmosphere instead of absorbing it, thus increasing greenhouse gas emissions. [May 2008 Military Implication, Sources]

MELTING SEA ICE AND GLACCIERS

Scientific evidences and possible consequences

Out of 14 research teams studying global warming impacts in the Arctic, 11 estimate retreat at least as extraordinary as in 2007, while the other 3 groups estimate ice extent heading back toward, but not equaling, the average minimum for summers since 1979, when satellite-based Arctic sea ice monitoring began. Five other groups chose not to issue a numerical estimate. The ongoing Study of Environmental Arctic Change, SEARCH, continuously presents updated information on ice assessments and explanations.

Meantime, some polar scientists believe that there is a 50% chance of a totally ice-free North Pole this summer. [June 2008. Military Implication, Sources]

Arctic sea ice has declined by about 10% in the past decade, note scientists from the University of Colorado's Center for Astrodynamics Research. They estimate that there is a 59% chance that this year in September the ice cover will reach a new record low, as currently the ice is thinner and younger than at any time since observations have been recorded. In September 2007, the extent of Arctic sea ice was the smallest on record.

Scientists are increasingly confident that human activity is the cause of the new weather patterns seen at both poles. Their findings are based on computer models that analyzed natural and human-caused variables, and were compared with the observed real conditions. The models revealed an ice-free Arctic by 2030—about two decades ahead of the predictions in the United Nations' Intergovernmental Panel on Climate Change reports. [May 2008. Military Implication, Sources]

The Japan Agency for Marine-Earth Science and Technology revealed that permafrost in Siberia is thawing at an alarming pace. In some areas the depth of the melted permafrost doubled compared to 2000. Thus the lakes and marshes expand, in some areas being about 3.5 times larger in 2007 than in 2000, consequently accelerating the melting process even more. The research also shows that the annual average ground temperatures at the depth of 1.2 meters from the surface rose gradually from minus 2.4^{o}C in the period from 1998–2004 to minus 0.4^{o}C in 2006. An additional negative result of permafrost melting is the release of high quantities of methane, further promoting global warming.

New research by climatologists from Bern University on ice cores from Greenland and Antarctica shows that Earth warmed faster in the 20th century than at any other time in the past 22 millennia, and concentrations of greenhouse gases are increasing at a faster rate.

UK scientists have found instability trends in the ice of part of West Antarctica, which could lead to a significant rise in global sea level. They warn that if the discharge of glacier ice into the sea continues, the Pine Island Glacier alone could raise global sea level by 25 cm and accelerate neighboring glaciers' discharge, which could raise the sea by 1.5m. [February 2008. Military Implication, Sources]

At the southwestern edge of the Wilkins Ice Shelf of western Antarctica, a chunk of ice with an area of about 400 sq km broke up into icebergs. This might trigger the disintegration of a larger part of the Wilkins Ice Shelf, which totals about 14,500 sq km, and is now connected by only a 6 km strip of ice.

According to data of UNEP's World Glacier Monitoring Service (WGMS), the average rate at which the world's glaciers are melting and thinning has more than doubled between the years 2004-2005 and 2005-2006. Analyzing data from around 100 glaciers, with continual annual data series for 30 reference glaciers since 1980, WGMS found that average 'water equivalent' loss has risen from 0.3 meter per year between 1980 and 1999, to about 0.5 meter per year after the year 2000, and estimates of 1.4 meters in 2006. Out of the 30 reference glaciers only one (Echaurren Norte in Chile) thickened in 2006 compared to 2005, while all the others shrank, with European glaciers being among the most affected. Glaciers represent the only fresh water source for millions of people around the globe. [March 2008. Military Implication, Sources]

Melting ice caps because of global warming may trigger more volcanic eruptions, scientists estimate. Thinning ice and thus reduced weight on the earth's crust changes the geological stresses inside the crust in general, and also intensifies the rate of magma melting, increasing the

possibility of eruptions, explain scientists Carolina Pagli of the University of Leeds, UK, Freysteinn Sigmundsson of the University of Iceland, and Bill McGuire of University College London in the UK.

Arctic permanent ice shelves are breaking off or cracking at a higher rate than feared, noted polar ice researchers who accompanied Canadian Rangers on a patrol around Ellesmere Island. They estimate that the High Arctic ice shelves could all be fragmented in a matter of years. Another study, by scientists of the National Center for Atmospheric Research (NCAR) and Colorado State University (CSU), reveals that new Arctic sea ice is on average so extremely thin, that it melts under the sunshine of clear summer skies it once could survive. U.S. submarines' readings reveal a 40% reduction in sea ice thickness since 1960.

The *Arctic Climate Impact Science – An Update Since the Arctic Climate Impact Assessment* report, produced for the World Wildlife Fund, presented to the Arctic Council, says that there could be factors contributing to climate change that were not even considered, since the real changes are happening much faster than predicted by computer models and scientists. The report estimates that the summer ice pack could be gone in 5 to 32 years.

Release of long-stored methane gas from the thawing of the Arctic is one of the phenomena that could have catastrophic warming effects. At the annual conference of the European Geosciences Union held in Vienna, Russian polar scientists presented evidence that the first stages of melting have already begun off the coast of Siberia, as well as on land in northern Siberia.

There is research underway for the use of this methane as fuel. The state-owned Japan Oil, Gas and Metals National Corporation announced that it wants to extract some 7 trillion tonnes of methane estimated to exist in Japanese coastal waters. However, there are fears that this might release huge volumes of gas with possible disastrous environmental consequences. [April 2008. Military Implication, Sources]

SEA LEVELS RISE

Scientific evidences and possible consequences

Six of the 18 inhabited low-lying Australian Torres islands have little or no elevation and are in danger of being swallowed by the sea. The islanders are already suffering because of abnormally high tides, land erosion, shifting seasons, and increasingly scarce marine life that traditionally constitutes their food source. Aborigines and Torres Strait islanders regained ownership of their traditional lands in 1992. Already socially and economically marginalized, the roughly 7,000 people are unhappy with the lack of attention and care on the part of the Australian government.

The Ocean Surface Topography Mission (OSTM)/Jason 2 mission to be launched in June will provide data for better understanding ocean currents and the rises in sea levels. Current marine measurements show that sea levels have risen on average by 0.3 centimeters since 1993, twice that, in the whole 20th century. The Jason 2 mission is a partnership between NASA, the National Oceanic and Atmospheric Administration, the French National Center of Space Studies (CNES), and the European satellite agency EUMETSAT. [May 2008. Military Implication, Sources]

A new study by Australian and US researchers shows that ocean waters are heating up 50% faster at the surface then previous estimates (including those in the IPCC report). This explains the more rapid than estimated sea level rise. They also underline that sea ice melting is not of great concern to sea level rise; nevertheless, land ice melting is: if it all melted, sea levels would rise 70m (however, fortunately, they say, 57m of those are locked up in Eastern Antarctica, which seems to be stable for 20 million years and is not affected much by global warming).

Rising sea levels and coastal erosion will render small Pacific islands uninhabitable by the end of the century. Anote Tong, president of the Republic of Kiribati, has appealed to the international community to take responsibility for relocating the country's 97,000 citizens.

Bangladesh, the world's most densely-populated nation, is at risk of disappearing under the water by the end of this century as result of 'saline inundation' in the inland region, and coastal erosion and flooding at the coastal area. India has already begun to take security measures against the expected mass migration.

Cities along Australia's northern and western coastline became vulnerable to 'the Venice effect' with increased frequency of flooding during seasonal high tides, revealed scenarios outlined in more than 40 submissions to a federal inquiry on the environmental impacts of climate change on coastal communities. Climate models suggest that mean sea-level rises on the east coast of Australia could exceed global averages, said the Bureau of Meteorology.

A report by the Japanese Ministry of the Environment urges the government to consider the effects of global warming—mainly rising seas and stronger storms—in long-term strategies, such as urban planning. It also suggests that residents in vulnerable areas should be relocated to safer places. [June 2008. Military Implication, Sources]

A forecast model shows that coastal erosion might increase 2-5 times over the next 50 years due to rising sea levels and more powerful storms. One of the most affected areas seems to be Russia's East Arctic coast, which might lose 5 to 15 meters per year in 2040-2045. Russia is already recording high retreat along its 50,000-km northern coastline because of permafrost melt and Arctic Ocean rising levels, waves and tides and subsequent thermal abrasion. About 33% of Russia's eastern Arctic coast also suffers from thermal abrasion. In some places, the coast's annual retreat reaches 15 meters.

Along China's 18,000-km (11,185 miles) coastline, sea levels have risen by an average of 9 centimeters (3.54 inches) over the past 30 years, and coastal waters are getting slightly warmer, reports the country's State Oceanic Administration. The most affected is the northern part, where, over the same period, sea level rise reached 19.6 centimeters (7.72 inches) at Tianjin port city, and 11.5 centimeters (4.53 inches) at Shanghai, causing increasingly huge problems in highly populated areas. Meanwhile, the *China 2007 Sea Environmental Quality Report* reveals increased pollution of coastal waters as a result of human activity.

The situation of the small islands of Tuvalu becomes increasingly critical. While the highest point of the islands is barely over 4 meters, a typical high tide reaches about 2 1/2 meters and a King Tide can be over 3 meters high; the forecast is that they will get higher due to global warming. The seawater is also surging up through the coral that forms the islands, salinizing the soil and groundwater.

The level of the Mediterranean is rising rapidly and could produce "catastrophic consequences", warns the study *Climate Change in the Spanish Mediterranean* by the Spanish Oceanographic Institute. Since 1990, the study estimates that the Mediterranean has risen between 2.5 and 10 millimeters (0.1 and 0.4 inches) per year, meaning that if present trends

continue, the water levels will rise between 12.5 centimeters (5 inches) and 0.5 meter (20 inches) in around 50 years. Mediterranean water temperatures also rose by 0.12 to 0.50 degrees Celsius since the 1970s. [January 2008. Military Implication, Sources]

Bangladesh, chair of the Least Developed Countries, insists that developed countries increase LDC's access to investment, resources and technologies needed to adapt to climate change effects. Of more than $1 billion pledged at the 2002 Johannesburg Earth summit for improving preparedness of vulnerable countries, less than $180 million have been delivered, and no contributions were yet made to the investment fund set at Bali. Being the most at risk, LDCs demand to take an active part in the global climate talks. At Bangladesh's request, Britain offered financial support for LDCs participation in negotiations and will host a conference in May addressing Bangladesh's vulnerability. A one-meter sea level rise would flood about one-third of Bangladesh, affecting about 25–30 million people.
Recent data from the U.S. Geological Survey warns of the danger that rising sea levels over the next 50 years represent to the U.S. coastal population. Among the most threatened are the islands of California's Sacramento-San Joaquin delta, the islands in Chesapeake Bay, parts of the Louisiana coast, and the New York subway system. However, the 5,000 residents of the California's delta islands are likely to become the first environmental refugees in the United States. The threat is the result of the interplay of two factors both effects of climate change: rising sea levels, and increased rainfalls over snow in the Sierra Mountains as a result of warming temperatures, thus raising the risk of floods. [March 2008. Military Implication, Sources]

Polar Bear, the First Species declared Endangered Due to Global Warming

Polar bears were declared a "threatened" species under the U.S. Endangered Species Act, becoming the first species officially designated in danger of extinction because of global warming. Environmental groups are not pleased with the new regulation, since important greenhouse gas emission-related activities, such as offshore oil and gas exploitation, are exempted from compliance with the law. [See also *Melting Glaciers and Sea Ice* in August 2007 and other similar items in previous environmental security reports.] [May 2008. Military Implications, Sources]

FOOD AND FRESHWATER

Food Crisis

As the food crisis intensifies around the world over the past few months, an additional 100 million people began suffering from hunger and there were food riots in some 30 countries, including recently conflict-torn countries such as Haiti, Côte d'Ivoire, Senegal, and Somalia. Some argue that the Security Council should consider the issue in order to stop escalation into larger global security crises. "The Security Council would be remiss in carrying out its responsibility for maintaining peace and security if it fails to take the much needed preemptory steps to stop further deterioration of the security dimensions of the global food crisis," says Anwarul Karim Chowdhury, a former Bangladeshi ambassador and UN High Representative for Least Developed Countries (LDC). He compared the food crises to others—such as HIV/AIDS–

–that were discussed at the Security Council level and recalls that the bodies dealing with the food situation (ECOSOC and FAO) do not have security-related mandates. [May 2008. Military Implication, Source]

Continually Rising Food Prices Threaten Long-Term Global Stability. According to UN data, global food prices rose 35% this year and have already risen 65% since 2002. Biofuels competition for land and water, climate change, oil prices, and increasing population and incomes all contribute to the long-term increases in food prices. The Food and Agriculture Organization found that dairy prices rose nearly 80% and grain 42% in 2007. With nearly 3 billion people making $2 or less per day, long-term global social conflict seems inevitable without more serious food policies, scientific breakthroughs, and dietary changes. [March 2008. Military Implication, Source]

The number of riots is likely to rise around the world as the number of people at risk of malnutrition grows due to commodity prices' increase, warn UN officials. The WFP, which feeds 73 million people in 78 countries (representing less than 10% of world's total undernourished) noted that it will face serious difficulties this year in helping to mitigate malnutrition. Food prices rise rapidly, driven mainly by decrease of supply as harvests are reduced by climate change effects (drought, floods, and extreme weather conditions); increasing food demand from countries such as China and India; increasing demand by the biofuel industry; and soaring oil prices. Additionally, the governments of some important food-exporting countries tend to put restrictions on exports, in order to assure their own food security.

Using computer models, analysts assessed how the 12 most food-vulnerable areas are likely to be affected by climate change in the next 20 years. This included the regions where most of world's malnourished people live: much of Asia, sub-Saharan Africa, and the Caribbean and Central and South America. The findings reveal that South Asia and southern Africa are the areas where climate change could cause severe crop losses, unless intense adaptation strategies are undertaken. The study also identified the likely effects by crop, therefore providing governments and aid agencies important information for building a comprehensive adaptation approach.

Food's Failed Estates = Paris's Hot Cuisine; Food Sovereignty – à la Cartel? by ETC Group analyzes food security prospects and policy failures and needs. It looks at all aspects that might drive food out of the reach of the marginalized, and warns that, without adequate action, the number of hungry people could increase by 50% by 2025.

The west of North America is seriously threatened by possible future lack of access to fresh water, as snowpack across the mountain ranges is shrinking, according to a computer analysis published in the journal *Science*. Using a complex system of factors' interplay, the results show that up to 60% of the climate change trends in the area are human-induced.

The World Wide Fund for Nature - South Africa (WWF-SA) is warning the country's government about a "looming water crisis for South Africa in the same way that it was warned a decade ago about the present energy crisis." The country already uses 98% of available water resources and it could run out of water by 2025. [February 2008. Military Implication, Sources]

An EU report, *Climate Change and International Security*, warns that water scarcity and food insecurity caused by rising prices and diminishing harvests, particularly in the Middle East, are likely to cause "serious security risks" for Europe and internationally.

African Environment Day, organized by the African Union (AU) Commission to raise awareness of the impact land degradation and desertification have on Africa's development, was observed under the theme "Adapting to Climate Change for Livelihood Security in Africa." [March 2008. Military Implication, Sources]

Continuous escalation of food prices worldwide increases distress in poor regions, raising the danger of social and political unrest. Demonstrations and/or riots due to unaffordable basic needs have already erupted in Egypt, Cameroon, Haiti, Burkina Faso, Indonesia, Ivory Coast, Mauritania, Mozambique and Senegal. FAO says that six countries have an "exceptional shortfall" of food supplies: Lesotho, Somalia, Swaziland, Zimbabwe, Iraq, and Moldova, while another six suffer of "widespread lack of access" to food: Eritrea, Liberia, Mauritania, Sierra Leone, Afghanistan and North Korea. Out of the estimated ~40 countries at "food crisis" risk, some 20 are or were recently affected by internal conflicts, and 21 have suffered from floods, droughts, and other weather disasters.

The International Assessment of Agricultural Science and Technology for Development *Synthesis Report* presents statistical analyses of basic food prices, an assessment of the state of world agricultural regions and threats to production; suggests several strategies and methods to increase agricultural efficiency, such as how to produce food that is less dependent on fossil fuels and favors natural fertilizers and traditional seeds; and offers suggestions for rational use and preservation of soil and water supply.

In Australia, a six-year-long drought reduced Australia's rice crop by 98% affecting local population, prices, and importing countries' food source. [April 2008. Military Implication, Sources]

Actions for addressing Food Crises

Secretary-General Ban Ki-moon announced a new international UN Task Force on the Global Food Crisis, composed of the heads of key UN agencies and institutions, to prepare a comprehensive plan of action to tackle the global rise in food prices. The elements of the task force's plan will be presented at the UN and FAO High-Level Conference on World Food Security, Climate Change and Bioenergy to be held in Rome, June 3-5, 2008.

The International Planning Committee for Food Sovereignty suggests the creation of a UN Commission on Food Production, Consumption and Trade, as a more inclusive mechanism to replace the UN Task Force. It also advocates that the food emergency situation should override previous trade and international agreements and a new trade dialogue should begin under the auspices of the UN. [May 2008. Military Implication, Source]

About 5,100 people from 181 countries, including 43 heads of state or government and 100 ministers, participated in the June3-5 FAO conference on World Food Security. The governments adopted the "Comprehensive Framework for Action" and pledged $13 billion during the conference. FAO Director-General Jacques Diouf estimates that $30 billion a year will be needed to re-launch agriculture and avert future threats of conflicts over food, and UN Secretary General Ban Ki-moon reiterated that food production should increase by 50% by 2030 to overcome the long-range food crisis. The next forums to address the food crises are the G8 summit in Japan in July, the UN/FAO Food Security Committee meeting in October, and the FAO Conference in November. [See also *Continually Rising Food Prices Threaten Long-Term Global Stability* in March 2008.] [June 2008. Military Implication, Source]

The International Federation of Red Cross and Red Crescent Societies launched a new five-year food security strategy in Africa focussing on long-term investments to improve food security programmes in 15 African countries. The new plan will include new technologies, seed banks and soil nutrient management, and the establishment of community-based food security monitoring systems.

The Twenty-Fifth Special Meeting of the Council for Trade and Economic Development (COTED) on the Environment held in Greater Georgetown, Guyana, April 17-18, 2008 focused on critical environmental issues that affect the lives of people of Small Island Developing and Low-Lying Coastal States. It was agreed that the Caribbean Community Environmental and Natural Resource Framework should address adaptation to climate change effects and food security and freshwater resources.

A conference hosted by the European Water Forum in the European Parliament on 16 April increased the warnings of growing water scarcity concerns, calling for speedy solutions to combat water shortages, which might include higher water prices to deter overuse.

In order to assist countries to adopt a new strategy for addressing food and water security by engaging international action to combat desertification, land degradation and drought, the UN Convention to Combat Desertification Secretariat is convening a high-level policy dialogue to be held in Bonn, Germany on May 27. [April 2008. Military Implication, Source]

Food security was the main theme of the 10th Summit of the Community of Sahel-Saharan States (CEN-SAD). The Tunisian delegation has submitted a proposal to set up a food security observatory for the Sahel-Saharan States (CEN-SAD) region, to prevent and/or deal with food crises. The role of the observatory would be to monitor agricultural products' availability and prices, and investments in agricultural growth, as well as natural resources such as water and soil, and formulate strategies and policies based on food availability and needs. The project should be funded by member states and partners, and the stakeholders should be member states and executive organs of the African Union and sub-regional organizations. [June 2008. Military Implication, Source]

Food Crises and Biotechnology

At this time, when food security threatens stability around the world, a few agricultural biotechnology companies are trying to concentrate corporate power, gain a monopoly over a large part of global food, undermine small farming and farmers rights, and most likely drive up costs. "Globally, the top 10 seed corporations already control 57% of commercial seed sales. This is a bid to capture as much of the rest of the market as possible," explains Hope Shand, Research Director of ETC Group. According to ETC Group's report, *Patenting "Climate Genes"...And Capturing the Climate Agenda*, Monsanto, BASF, DuPont, Syngenta, Bayer and Dow—along with some biotech partners—have filed 532 patent documents on genes related to environmental stress tolerance at patent offices around the world. In the meantime, poor countries complain that unfair policies are threatening their local seeds, undermining agricultural productivity and jeopardizing national food security. Some Indian farmers are giving up planting rice, because it is not cost-effective anymore, due to the high prices of fertilizer, seeds and pesticides. [May 2008. Military Implication, Source]

Water Scarcity

Experts (including Nicholas Stern) attending the Goldman Sachs 'Top Five Risks' conference, reiterated the warning that the possible future water shortage would be a bigger threat to mankind this century than the food crises and exhaustion of energy reserves. The Himalayas for instance are the source for all the major rivers of Asia and for almost half the world's population.

In Africa, to shrinkage of mountain glaciers from Mount Kilimanjaro to Uganda's Rwenzori mountains—which decreased by 50% between 1987 and 2003, drying lakes such as Lake Chad, and falling water levels in Lake Victoria, the atlas adds new cases of disappearing water bodies like Lake Faguibine, as well as the many examples of desertification, unsustainable large-scale irrigation and degraded coastal areas that are further increasing the threat to already scarce water reserves. [June 2008 Military Implications, Sources]

Global warming is most probably the cause of changing rainfall patterns in Australia, concluded scientists gathered to discuss recent findings by the South-Eastern Australia Climate Initiative (SEACI). Assessing specifically the decline of rainfall and inflows into the Murray-Darling river systems over the past decade, SEACI, a three-year project that began in 2006, reveals that the Southeast Australian water system will most likely be increasingly stressed in the future as rainfall is expected to be significantly reduced, concomitantly with suspected warmer temperatures. Dr Wendy Craik, chief executive of the Murray-Darling Basin Commission, notes that in some parts of the basin the drought is more severe than the worst climate change predictions for 2055. Since future prospects are not encouraging, drought-adaptation strategies should be considered. [May 2008. Military Implications, Sources]

Water security will be affected by earlier melting of glaciers and mountain snow, leaving millions of people in need during the summer when rainfall is lower, warn scientists. The earth's sub-tropic zones, home to 70% of the world's population, are the most vulnerable. The areas most at risk include parts of the Middle East, southern Africa, the United States, South America and the Mediterranean.

The fast melting high altitude glaciers in Andean mountains alter eco-systems, affecting the livelihood of people of Peru, Ecuador and Bolivia. The IPCC estimated that rising temperatures could melt most of Latin America's glaciers by 2022. In some regions, demand for water might exceed supply as soon as 2009. [April 2008. Military Implications, Sources]

World Water Day theme in 2007 was 'Coping with Water Scarcity' to highlight limited water resources and the imbalances between availability and demand.' If today water scarcity affects 700 million people around the world, by 2025, this could rise to more than 3 billion. Since many of the world's rivers and aquifers are shared among countries, conflicts are likely to be exacerbated, unless integrated cross-border water management systems are implemented. Several reports released on the occasion of World Water Day reveal today's realities, suggesting policies and future possible developments. The WWF report, World's Top Rivers at Risk, warns that global warming and man-made causes destroy some of the world's largest rivers, threatening ecosystem and people's livelihood. The report assesses pollution, development, and water management of ten of the world's most important rivers: the Nile, the Danube, the Rio Grande, La Plata, Yangtze, Mekong, Salween, Ganges, Indus, and Murray-Darling. It is calling on

policymakers to take notice of the emergency nature of the situation and to set up strategies to reverse damage to freshwater sources. "Conservation of rivers and wetlands must be seen as part and parcel of national security, health and economic success," stressed Jamie Pittock, WWF Global Freshwater Programme Director. The IPCC report Impacts, Adaptation and Vulnerability, forecasts that "hundreds of millions of Africans and tens of millions of Latin Americans who now have water will be short of it in less than 20 years. By 2050, more than 1 billion people in Asia could face water shortages. By 2080, water shortages could threaten 1.1 billion to 3.2 billion people, depending on the level of greenhouse gases that cars and industry spew into the air." The report will be released at the beginning of April. As Peru's glaciers are melting, the country might run out of water. In China, air pollution is causing reduced rainfall, increasing drought in northern China. [See also *World Water Forum* 2006, *Unless Water Management Improves, Conflicts over Water Are Inevitable*, and other previous environmental security reports on the water issue.] [March 2007. Military Implications, Sources]

Acctions for Addressing Water Security

A Review of Decision-Making Support Tools in the Water, Sanitation, and Hygiene Sector, a study directed by Peter H. Gleick at the Pacific Institute and by Geoffrey D. Dabelko at the Wilson Center's Environmental Change and Security Program, evaluates 120 existing resources in the sector, analyses the world's situation on access to water and sanitation, and assesses existing technologies and methodologies. The report recommends development of a set of tools to help decision-makers with infrastructure development, available technologies, and possible approaches. The tools would also outline specific needs of geographic locations, evaluate community particularities, and use case studies to demonstrate available technologies. [May 2008. Military Implications, Source]

Improvements in the International Stormwater BMP Database (www.bmpdatabase.org) were recently announced. They will ease BMP searches, data collection and uploading, and access to BMP performance analyses. The changes include more data, new data analysis results, easier Web site navigation, and simplified data entry. [May 2008. Military Implications, Source]

Singapore established an Institute of Water Policy with a US$5.5 million 5-year budget to research Asia's water problems, address water security, and consult to governments and international organizations. [June 2008. Military Implications, Source]

Climate Change and Access to Water Addressed as Human Rights

The seventh regular session of the Human Rights Council adopted 36 resolutions on a wide range of issues, including two major reports to be delivered in three years to the tenth session of the Council: one on water as a human right, and another on the relationship between climate change and human rights. In the meantime, 2008 is the 60th anniversary of the Universal Declaration of Human Rights, which will also increase reflections on these two topics. [April 2008. Military Implications, Sources]

PREVENTION AND ADAPTATION

Adaptation Needs and Actions

Scientists are increasing efforts to assess the 'hot spots' that will be most affected by climate change in order to orient policy making and businesses to help those areas to adapt and cope with new challenges. Investors are already funding projects ranging from new agriculture practices and flood defense systems to renewable energy sources. In Australia, where drought might become the rule and fresh water is already scarce, nearly every major coastal city has a desalination plant, with some, like Perth, with almost all fresh water coming from the ocean, and Melbourne and Sydney soon to desalinate 20%. The energy required by desalination will be mostly green.

Over half of the Republic of Maldives' 200 inhabited islands are eroding at an alarming rate, in some cases forcing relocation of entire island communities. Adaptation actions began already, by raising a massive seawall made of concrete tetrapods that surrounds the entire capital of Malé, and even constructing new artificial, taller islands, such as Hulhumalé. [January 2008. Military Implication, Sources]

"The UN estimates that all but one of its emergency appeals for humanitarian aid in 2007 were climate related," notes the *Climate Change and International Security* report.

The Kyoto Protocol's Adaptation Fund Board held its inaugural meeting in Bonn, Germany, on March 28, 2008. The Fund will finance concrete adaptation projects and programs in developing countries. The fund now estimated at about $58.4 million is expected to increase to $80-300 million over 2008-2012. The finance source is a 2% levy of the Clean Development Mechanism, so it is "not reliant on donor funding or overseas development assistance. This is the climate regime beginning to become self-financing," noted Yvo de Boer, Executive Secretary of the UN Framework Convention on Climate Change.

The Caribbean states agreed to set up a joint tsunami early warning center by 2010. The center will relay information from national geological institutes across the region. Barbados, Puerto Rico, and Venezuela were named as possible hosts of the center, which would have a $250,000 annual budget funded by national governments, France, the U.S., and UNESCO. [March 2008. Military Implication, Sources]

Regional Strategies

Indigenous Peoples Demand More Involvement in Environmental Policies

Climate change was the special focus of the UN Permanent Forum on Indigenous Issues, held in New York, April 21-May 2, 2008. The approximately 3,300 delegates representing the 370 million indigenous people from around the world stressed that indigenous peoples should be included in the international debate on climate change. The Forum suggested that a working group on local adaptation measures and traditional knowledge of indigenous peoples be established, since they can provide important insights for designing and implementing sustainable mitigation and adaptation strategies. [May 2008. Military Implications, Sources]

HEALTH

Environment and Human Health Integration

Integrating Environment and Human Health, and *Climate, Poverty and Health: Time for Preventive Medicine* published by the National Council for Science and the Environment (NCSE) address the interconnection between human health and environmental components. The recommendations include: interdisciplinary approaches for better integration of environmental and health perspectives; improved communication between environmental and health communities, and between scientists and decision makers and the public; and improving priority setting in science. The NCSE activities in this area are continuing. [March 2008. Military Implications, Sources]

Actions to Address Health Threats

Antigenic Maps Help Trace Development of Diseases

Derek Smith, professor of infectious disease informatics at Cambridge University's Department of Zoology, and colleagues at Los Alamos National Laboratory and Erasmus Medical Center in Rotterdam, have developed software that, according to a *Scientific American* article, "create[s] an antigenic [stimulates the production of antibodies] map that documents 13,000 human flu strains isolated over the past five years When these results are plotted on a digital antigenic map, researchers can see in fine detail how the body's immune system responds to different mutations of the virus." [April 2008. Military Implications, Source]

A Community Guide to Environmental Health Available for Liaison Activities

The Hesperian Foundation is making available *A Community Guide to Environmental Health*, a tool kit for communities working on environmental problems. According to the announcement, the new work "is a collection of best practices from communities worldwide that address both the immediate symptoms of environmental threats as well as the root causes of environmental problems" and "contains numerous easy to follow actions and educational activities, ranging from the simple to the more complex based on a community's needs and resources." [June 2008. Military Implications, Source]

COMPUTER MODELING

Climate scientists and modelers warn that climate change forecasting abilities are still relatively weak and that some of those considered in policymaking—such as the IPCC assessments—are highly debatable, being too conservative and not taking into account the latest research.

Climate modelers from around the world met at the World Modelling Summit for Climate Prediction, held in Reading (UK), May 6-9, 2008, to try to improve forecasting abilities,

including measures that will allow a better understanding of how the climate will be affected locally as well as globally. At the end of the four-day summit, scientists made the case for a climate-prediction project on the scale of the Human Genome Project. A key component of this scheme would be a world climate research facility with computer power far beyond that currently used in the field. [May 2008. Military Implication, Sources]

The results of a new study by MIT researchers reinforce the connection between climate change and the intensity of storms. The new findings, based on pure theoretical computer simulation analysis using the Global Circulation Models, are consistent with the results of an earlier study, based on historical data, which showed a near doubling in the intensity of Atlantic storms over the last 30 years. Both studies confirm an increase in the intensity and duration of tropical cyclones, but, as for the future, many clarifications are still needed to determine the effects of global warming and CO_2 on storms' number and intensity. [April 2008. Military Implication, Sources]

At a meeting held in Geneva, Switzerland, the World Meteorological Organization (WMO) urged scientists to improve climate predictions that would help adaptation to climate change. The session focused on improving the science of seasonal climate prediction to help save human lives. The three-day convention was a preamble for the World Climate Conference focusing on climate prediction and its impact for decision-making, scheduled to be held next year.

A study by some of the most respected climate policy researchers revealed that there is no time to postpone cutting CO_2 emissions. By quantifying the impact of every year of delay, they found that the more reduction action is delayed, the more difficult mitigation becomes, and at some point, it becomes too late and no mitigation action could help. The maxim limit delay is much closer then expected—a maximum of 10–20 years. [February 2008. Military Implication, Sources]

C Protecting the Environment Due to Its Inherent Moral Value

ENVIRONMENTAL SECURITY-RELATED INTERNATIONAL REGULATIONS THAT HAVE BEEN OR ARE CLOSE TO COMING INTO FORCE SINCE JULY 2007

Waste Export Regulations Revised and Tightened

The 'Green' list of the Waste Shipment Regulation, which controls the movement of non-hazardous recyclable waste within, into, or out of the EU, has been updated to better protect the non-OECD countries against receiving from wealthier nations materials they do not want or cannot process in an environmentally sound way. The Revised Green List Regulation 1418/2007 came into effect on 18 December 2007 with a transition period of 60 days for certain wastes and countries. The complementary changes to the UK Transfrontier Shipment of Waste Regulations will come into effect on 5 February. [See also *EU Waste Shipment Legislation Came into Force* in July 2007 and other related items in previous environmental security reports.] [January 2008. Military Implications, Sources]

Shipwrecks Removal Treaty Received First Signature

The Nairobi International Convention on the Removal of Wrecks adopted in May 2007 provides an international legal framework to deal with shipwrecks presenting possible safety and/or environmental hazards. According to the International Maritime Organization, the number of abandoned shipwrecks worldwide is estimated to be 1,300, and the threat they represent has been increasing. The convention provides the legal basis for States to remove the wrecks, or have them removed, and have the registered owner liable for costs incurred. The Convention is open for signature until November 18, 2008, thereafter being open for ratification, accession or acceptance; it will enter into force 12 months after the date it receives ten ratifications (or accessions or acceptances). [March 2008. Military Implications, Sources]

Environmental Damage to Be Criminalized in the EU

The Permanent Representatives Committee approved the proposal on the protection of the environment through criminal law. EU national governments will have to apply criminal sanctions to those causing "deliberate or negligent damage to the environment." The list of punishable crimes will include: unlawful discharge of pollutants which could cause "death or serious injury to any person" or "substantial damage" to the environment; illegal waste shipment; killing or possession of protected fauna or flora; significant deterioration of habitats within protected sites; and any action related to ozone-depleting substances. The penalties are left to the discretion of member states as long as they are "effective, proportionate and dissuasive." The Directive is pending final approval by the Parliament and the EU Council, and is expected to enter into force in 2010. [See also *Environmental Crime Could Become a Felony in the EU* in February 2007 environmental security report.] [May 2008. Military Implications, Sources]

EU Airline Carbon Trading to Start in 2011—a Year Earlier than Planned

The European Parliament's Environment Committee voted to include aviation in Europe's emissions trading scheme from 2011—a year earlier than planned. Airlines should bid for at least

25% of pollution permits. Members of the European Parliament want to set CO_2 emissions cap at 90% of the levels between 2004 and 2006 rather than 100%, with the cap lowered in subsequent years from 2013. [See also *New European Environmental Regulations* in December 2007 and *Europe to Propose Emissions Targets for All Flights to/from or within Europe* in November 2006 environmental security reports.] [May 2008. Military Implications, Sources]

France Bans 30 Pesticide Components

As of February 2008, France banned the sale of 1,500 pesticides containing any of 30 chemicals deemed hazardous, planning to gradually phase out a total of 53 phytosanitary substances. [February 2008. Military Implications, Sources]

PROPOSED TREATIES AND/OR CHANGES TO EXISTING ONES

Waste Management

Basel Convention Needs Revision and Update

The 9th meeting of the Conference of the Parties to the Basel Convention (COP9) on the Control of Transboundary Movements of Hazardous Wastes and their Disposal took place June 23-27, in Bali, Indonesia. The focus was a stronger regulation on the export of hazardous waste, mainly electronics which litter poor nations. Despite support from the African delegates and the EU, the representatives from 170 countries to the conference decided against banning toxic waste exports, rather encouraging voluntary actions at national level using some new guidelines to create their own recycling laws. [See also *Half of Transported European Hazardous Waste Could Be Illegal—How Much More Elsewhere?* in April 2008, *UN E-Waste Forum and Basel Convention's Conference of Parties* in December 2006, and other related items in previous environmental security reports.] [June 2008. Military Implications, Sources]

EU Vote on Revision of Waste Directive

The European Parliament approved the revision of the waste framework directive, which is the basis of the EU waste management policy. The new directive will replace three others—Waste Framework Directive, the Hazardous Waste Directive and the Waste Oils Directive, setting clear definitions and waste management principles and creating a sound, harmonized legal framework for waste treatment. [See also *EU New Strategy on Waste Recycling* in December 2005 and other similar items in previous environmental security reports.] [June 2008. Military Implications, Sources]

Chemical, Biological, and Nuclear Safey

Stockholm Convention on Persistent Organic Pollutants Is Succeeding in Europe

A recent study has evaluated the effectiveness of the Convention on Long-range Transboundary Air Pollution (LRTAP) in the UN Economic Commission for Europe countries, excluding Canada and the US. The research revealed that many persistent organic pollutants (POPs)

decreased considerably and will continue to decrease as the LRTAP POP protocol is becoming fully implemented by all countries. These results are significant for the global Stockholm Convention on Persistent Organic Pollutants and for developing a global monitoring plan for POPs. The study also included preliminary assessments for eight "candidate" POPs (Hexachlorobutadiene (HBU); Pentabromodiphenyl ether (PBDE); Pentachlorobenzene (PCBe); Polychlorinated naftalenes (PCN); Pentachlorophenol (PCP); Endosulfan, Dicofol; and short chain chlorinated paraffins (SCCPs)) which could be added to the POP list in the future. [See also *Stockholm Convention on POPs Adopts Evaluation but not Non-compliance Mechanisms* in May 2007, *New Chemicals Proposed to be Added to Stockholm Convention on POPs* in 2005, and other related items in previous environmental security scanning reports.] [February 2008. Military Implications, Source]

EU to Add Carbon and Graphite to REACH Program

Carbon and graphite were deleted from the list of exemptions (Annex IV) of the EU's Registration, Evaluation, Authorization and Restrictions of Chemicals (REACH) regulation, due to possible health hazards when they are used in nano-sized form (as in carbon nanotubes). Therefore, companies producing, using, or trading with carbon and graphite now on have to comply with the REACH requirements. REACH entered into force on June 1, 2007 and its administrative office, the European Chemicals Agency, was inaugurated in Helsinki on June 3, 2008. [See also *New Study Raises Asbestos-type Health Worries for Nanotubes* in May 2008, and *REACH Entered into Force on June 1, 2007* environmental security reports.] [June 2008. Military Implications, Sources]

Canada Prepares to Ban More Chemicals

The government of Canada announced that it is preparing to issue a ban on a number of chemicals in common use in various applications, because of possible harm to human health or the environment. The 11 chemicals include vinyl acetate, ethylene oxide, thiourea, isoprene, and cyclohexasiloxanes. Industry has 60 days to offer countervailing evidence. [See also *Questions on Bisphenol A Risk Raised Again* in April 2008 environmental security report.] [May 2008. Military Implications, Source]

Reactive Nitrogen Beginning To Be Recognized As Environmental Hazard

Two papers in the May 16 issue of *Science* discuss the problem of excessive reactive nitrogen in the environment. According to Univ. of Virginia environmental sciences professor James Galloway, "We are accumulating reactive nitrogen in the environment at alarming rates, and this may prove to be as serious as putting carbon dioxide in the atmosphere." Atmospheric nitrogen can appear as nitric acid in water and vegetation or can contribute to the greenhouse effect. The International Nitrogen Initiative ((www.initrogen.org) has been established to serve as a center for efforts to cope with this problem. [See also *New Predictions for the Atmosphere by 2030* in October 2006 environmental security report.] [May 2008. Military Implications, Source]

Pollution and Greenhouse Gases

Provisional Agreement for Including Aviation in the Emission Trading Scheme from 2012

The EU lawmakers reached agreement with Member States to include aviation in the greenhouse gas emissions trading scheme from 2012. The airlines will have to cut emissions by 3% in the first year, and by 5% from 2013 onwards, paying for 15% of their permits to pollute. Presently, aviation generates an estimated 3% of EU CO2 emissions, but air traffic is expected to double by 2020. [See also EU Airline Carbon Trading to Start in 2011—a Year Earlier than Planned in May 2008 and other similar items in previous environmental security reports.] [June 2008. Military Implications, Source]

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European Parliament Approves New Water Quality Standards Directive

The European Parliament approved the new directive on water environmental quality standards to harmonize quality standards across the EU and thereby better protect surface waters (rivers, lakes and coastal waters) against pollution from a range of 33 priority chemicals. . The new directive is the final major piece of legislation in the Water Framework Directive and replaces five existing directives, simplifying water-related reporting within the newly created Water Information System for Europe. Member States have until December 2009 to comply. [See also *EU to Introduce New Regulations to Combat Surface Waters Pollution* in July 2006 environmental security report.] [June 2008. Military Implications, Sources]

Post-Kyoto Protocol Negociations

The theme for World Environment Day 2008 was “Kick the Habit: Towards a Low Carbon Economy”, recognizing the need for a strategy to reduce greenhouse gas emissions from fossil fuel.

The group of 16 nations accounting for about 80% of the world’s CO_2 and other greenhouse gas emissions—G8 plus Australia, Brazil, China, India, Indonesia, Mexico, South Korea and South Africa—attending the Major Economies Meeting held in Seoul, failed to agree on clear targets to cut greenhouse gas emissions. The draft agreement mentions rather generic “deep cuts” based on the “ambitious” scenario outlined by the IPCC (although its target of 50% reduction by 2050 is not mentioned in the draft statement.) The statement is expected to be adopted at the July G8 summit to be held in Japan. Nevertheless, Yvo de Boer, head of the UN Framework Convention on Climate Change expressed hope and the urgency that the Japan G8 summit set clear emission targets for a post-2012 treaty.

The EIA *International Energy Outlook 2008* looks at energy trends up to the year 2030, estimating global energy consumption will grow by 50% with 85% of that in non-OECD states. CO_2 emissions will likely increase by 51% (1.7% annually), with non-OECD states expected to exceed OECD members' emissions by 72% in 2030.

Meantime, James Hansen of NASA warned again that the world has passed the "dangerous level" for greenhouse gases in the atmosphere and should cut to 1988 levels. He said "This is the last chance," to avoid "changes such as mass extinction, ecosystem collapse and dramatic sea level rises."

The German government approved a climate package—focusing mainly on the transport and construction sectors—designed to help reach by 2020 the target of reducing CO_2 emissions by 49% compared to 1990 levels. [June 2008. Military Implications, Sources]

Moves Forward on the Post-Kyoto Negotiations

Bali Roadmap Sets Framework for Post-Kyoto Negotiations

The report *From Bali to Poznan: New Issues, New Challenges* summarizes the discussions and outcomes of the conference with the same name held at the European Parliament in Brussels, December 18, 2007, convened by the Institute for Environmental Security in cooperation with other interested organizations. It assesses the impact of climate change on international security and sustainable development, a switch to solar energy as an alternative to fossil fuels, implications of illegal trade in natural resources, and the ways climate change influences European foreign policy. The report can be seen as background policy information for the next UNCCC to be held in Poznan in December 1-12, 2008. [May 2008. Military Implications, Sources]

The two-day GLOBE forum (Global Legislators Organization for a Balanced Environment) was organized as a preamble to the G8 summit to be held in July. It was attended by about 100 lawmakers from the Group of Eight industrial countries (Britain, the United States, France, Germany, Italy, Russia, Canada and Japan) and fast-developing nations (China, Brazil, India, South Africa and Mexico). The main subjects were: discussing a draft post-Kyoto Protocol treaty, the need for G8 countries to intensify efforts to meet the Kyoto targets, and strategies to help developing nations improve practices for reducing emissions.

UN Secretary-General Ban Ki-moon's message to the UNEP Global Ministerial Environment Forum called for a "decisive and deep regime for emissions reductions after 2012" and for the development of "financial incentives and mechanisms so markets can respond to the opportunities of a rising carbon price" under the guidance of the Bali road map. [February 2008. Military Implications, Sources]

The first meeting since the December Bali conference for negotiating a post-Kyoto climate change treaty is being held in Bangkok, March 31-April 4. It aims to move forward the Bali Roadmap. Key issues on the agenda include limiting greenhouse gas emissions, adaptation, mitigation, deployment of climate-friendly technologies, and financing. [Note: the meeting was ongoing at the time of this writing and the outcomes will be included in next month's report.] It is hoped that negotiations will be concluded next year at a major Copenhagen summit.

Humanity lost an important decade of actions to curb global warming, because of protracted negotiations, noted Robert Watson, now chief scientific adviser at the U.K. environment ministry, and former chairman of the UN Intergovernmental Panel on Climate Change. He emphasized the swift need for a new treaty that would set more ambitious long-term goals for reducing greenhouse gas emissions in order to limit temperature rise to 2°C by the end of the century. Mr. Watson considers that the targets for developed countries should be 80% rather than the projected 60%, while for developing countries the allowed rise should be 60% rather than a projected 140%. He underlined that such goals imply the implementation of a mixture of technologies and increased technology transfer. [March 2008. Military Implications, Sources]

National and Regional Initiatives

The meeting of the environment ministers from the Group of Eight industrialized nations held in Kobe, Japan, concluded with an agreement on the long-term goal of cutting greenhouse gas emissions in half by 2050, but without any specific emissions reduction targets for 2020. [May 2008. Military Implications, Sources]

While negotiations for a post-2012 treaty continue, questions are growing about better enforcement mechanisms of the Kyoto Protocol to compel governments to respect their commitments. Change of government shouldn't allow policy changes relative to a country's international commitments and ratified regulations. Canada, Japan and some southern European countries are all well behind their targets. "The biggest concern comes from countries like Canada that have openly begun voicing doubts about whether they will comply or even care about complying," said Antonio Hill, from Oxfam. [April 2008. Military Implications, Sources]

China's CO_2 emissions grew much more than previous estimates, revealed a new analysis by economists at the University of California. The Intergovernmental Panel on Climate Change estimated annual CO_2 increase in the region that includes China at 2.5%–5% for 2004–2010, while the new University of California analysis estimates a growth rate of at least 11% for the same time period. This finding reinforces beliefs that any climate change treaty should include mandatory emission targets for big emitter developing countries. [March 2008. Military Implications, Sources]

Japan is considering strengthening national regulations (such as introducing compulsory caps on greenhouse gas emissions and a domestic emissions trading scheme for the companies that resist reducing emissions). It is also expected to make tougher commitments in the post-Kyoto Protocol phase. [February 2008. Military Implications, Sources]

The newly elected Australian government sponsored a 2020 summit during April 2008. One thousand selected invitees spent two days considering ten themes, including Australia's long-term role in the region. A detailed response to the summit is expected from the Government by the end of 2008. The new Australian government has taken a more aggressive approach to CO_2 emissions reduction and the 2020 summit held in April 2008 encouraged the government to further take a regional lead in this area. The government has committed Australia to a carbon-trading scheme by 2010. [April 2008. Military Implications, Sources]

Governors of 20 U.S. states signed the Governors' Declaration on Climate Change at the 2008 Conference on Climate Change held at Yale University. The Declaration is establishing a partnership between the states and the federal government to increase efforts to control and reduce greenhouse gas emissions. At the same meeting, Premier Jean Charest of Quebec, Canada, announced that Quebec is joining the Western Climate Initiative, which calls for a 15% reduction in greenhouse gas emissions below 2005 levels by 2020. [April 2008. Military Implications, Sources]

Energy Saving

Vanishing Supply of World's Helium Calls for Conservation

The world's largest reserve of helium may be depleted in as short a time as eight years, experts say; they also point out that the gas is non-renewable and irreplaceable. It has a number of applications in science and technology, and in industry, e.g., nuclear magnetic resonance, mass spectroscopy, welding, fiber optics and computer microchip production. Helium is found in some natural gas reservoirs, and Russia may be a future supplier. Its separation from the atmosphere is prohibitively expensive. [January 2008. Military Implications, Source]

Biological Diversity

New Mechanisms for Enforcing Biosafety and Biological Diversity Treaties

The focus of the fourth Meeting of the Parties to the Cartagena Protocol on Biosafety (COP/MOP 4), held from 12-16 May 2008 in Bonn, Germany, was on enforcement measures. It adopted 18 decisions on issues related to: the Biosafety Clearing-House; identification and handling of living modified organisms; notification requirements; risk assessment and risk management; and monitoring and reporting. The timetable and framework were set for a liability and redress regime concerning potential damage caused by the movements of genetically modified organisms, which will be further discussed at the next meeting of the parties to take place in October 2010, in Nagoya, Japan. An ad hoc technical expert group was mandated to consider risk assessment and risk management issues. The *Rules, Procedures and Mechanisms Applicable to Processes under the Cartagena Protocol on Biosafety* was also published at this meeting. The Ninth Meeting of the Parties to the Convention on Biological Diversity followed, May 19-30, 2008, also in Bonn, Germany, assessing mechanisms to reduce loss of biodiversity. The CBD COP 9 adopted the "Bonn roadmap" that addresses issues concerning an international regime on access and benefit-sharing; a mechanism for assessing marine areas in need of protection; a resolution on biodiversity and climate change, including language cautioning against ocean fertilization; and an agreement on biofuels. [See also *International Biodiversity Meetings Make Decisions* and *Tougher Systems to Control GMO Suggested* in March 2006 environmental security report.] [May 2008. Military Implications, Sources]

Deforestation Not Yet Adequately Addressed by International Regulations

The UN Convention on Biological Diversity held a five-day meeting in Rome, Italy, to discuss how agricultural and forest biodiversity are affected by climate change. A focus was on

mangrove: according to scientists, 20% of mangrove forests have been lost, and economic and environmental damages should be addressed. Mangroves' destruction could cause biodiversity loss in tropical areas, increase CO_2 emissions, and destroy people's livelihoods. There are no strategies yet to deal with the situation, although scientists warn that if not addressed now, in the next ten years the crisis could get out of control. Along the same lines, African forestry protection organizations and the Food and Agricultural Organization (FAO) held a meeting on specific climate change issues, discussing strategies to find the best compromise between humans' interests, food crops, deforestation, and wildlife. Environmental degradation and loss of livelihood due to deforestation are underlying and/or multiplier causes of conflict, mainly in already fragile states or conflict-torn regions. [February 2008. Military Implications, Sources]

Marine Environment

IMO Sets New Limits on Ship Fuel Pollution

The International Maritime Organization has agreed on severe new limits on ship fuel pollutants, especially sulphur (sulfur). The restrictions are to be implemented by 2015, and will impose a change in sulphur limits in special Sulphur Emission Control Areas (SECA) to 0.1% from the current 1.5%. The set of SECAs, now including only Baltic and North Sea areas, is likely to be expanded to other coastal regions in the world. [May 2008. Military Implications, Source]

Marine Protection to Increase

The International Whaling Commission 2008 Scientific Committee report reveals alarming results that the number of ocean dead zones has grown to 400, from only 44 areas reported in 1995. UNEP says that man-made activities such as use of fertilizers, and sewage and other pollutants, combined with the impact of climate change, have led to the doubling of the number of oxygen-deficient dead zones every decade since the 1960s. Meantime, New Zealand put forward a new Exclusive Economic Zone Environmental Effects Bill, expected to be introduced by late August, which will apply to environmental effects of currently unregulated activities in the EEZ. [See also *International Conference and Assessments Find Rising Ocean Pollution* in October 2006 and other similar items in previous environmental security reports.] [June 2008. Military Implications, Sources]

Concerns over Maritime Air Pollution Increase

A new report by the International Maritime Organization reveals that emissions from shipping are rising rapidly; annual CO_2 emission from the world shipping industry reached 1.12 billion tonnes in 2007, representing about 4.5% of global CO_2 emission—three times higher than previously thought—and by 2020 is expected to rise by 30%, making shipping responsible for nearly 6% of global emissions. Sulphur dioxide emissions from ships now stand at 16.2m tonnes a year and are expected to increase by 40%, to 22.7m tonnes by 2020. Nevertheless, emissions from shipping are difficult to regulate by international treaties, due to the complexity of attributing them to individual states. The International Maritime Organization is now assessing regulation proposals and the Sub-Committee on Bulk Liquids and Gases submitted draft amendments to the International Convention for the Prevention of Pollution from Ships (MARPOL) Annex VI and amendments to the Emission of Nitrogen Oxides from Marine Diesel

Engines Technical Code. If approved by the Marine Environment Protection Committee (which meets at the end of March) the amendments could enter into force in March 2010 (or on a date to be decided.) The EPA put forward to the IMO a proposal that vessels be required to switch to cleaner fuel or use clean-up technology to reduce toxic grit from emissions when they are closer to shore, and it hopes that it would be adopted as an international regulation by 2011. EPA also plans to issue its own rules in 2009. Designing more efficient ships, reducing speed, and using higher quality fuel might be some of the easiest and fastest measures for reducing emissions. [February 2008. Military Implications, Sources]

Whale Conservation Protected Efforts Increasing

The U.S. National Marine Fisheries Service has released its recovery plan for Puget Sound's endangered killer whales. The plan covers about 2500 square miles, including the waters around the San Juan Islands, the Strait of Juan de Fuca and all of Puget Sound. One of its aspects includes assessing and improving vessel traffic guidelines in and around protected areas.

Japan continues its whaling in waters off a section of Antarctica that Australia declared a whale sanctuary and over which it claims sovereignty. In January, an Australian Federal Court declared that whaling in the sanctuary was illegal and should stop. Australia's new Prime Minister, Kevin Rudd, also calls for an end to whaling and New Zealand Prime Minister Helen Clark warned that photos of the Japanese whaling fleet revealing their location would be published if they entered New Zealand's Antarctic waters.

A Pew Whale Symposium, entitled "A change in climate for whales," was held at UNU Headquarters in Tokyo, Japan, January 30-31, 2008, as a prelude to an intersessional meeting on strengthening the International Whaling Commission, to be held March 6-8, 2008, in London. [See also *Shipping Regulations for Protecting Whales* in September 2007, *New Marine Protected Areas Proposed* in March 2007, *Commercial Whaling Ban Strengthened by International Whaling Commission (IWC)* in June 2007, and other items on similar issues in previous monthly reports.] [January 2008. Military Implications, Sources]

New Pacific Marine Protected Area Is World's Largest

Kiribati has established the Phoenix Islands Protected Area, covering 410,500 square kilometers in the central Pacific. A representative of the New England Aquarium, which is advising the Kiribati government, stated, "The new boundary includes extensive seamount and deep-sea habitat, tuna spawning grounds and as yet un-surveyed submerged reef systems." [February 2008. Military Implications, Source]

Plastic Threats to the Marine Environment

Researchers are increasingly warning of the long-term threat from plastic waste to the marine environment as studies confirm the risks from hidden contamination. While most attention is focused on dangers that visible items of plastic waste pose to wildlife, new researches investigate the impact of underwater microscopic plastic fragments on tiny marine organisms. Researchers note that all continents experience plastic contamination and plastic particles could represent as much as one-quarter of the total weight of sandy material samples gathered on shorelines at the high tide mark. [See also *The Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matte*r Enters into Force in March 2006 and other previous environmental security reports on similar issues.] [March 2008. Military Implications, Source]

Weapons-related

European Parliament Passed Resolution Calling for Global Ban of DU Weapons

The European Parliament agreed, with 491 out of 521 votes, to accept a resolution calling on the EU to lead negotiations "through the UN or through a 'coalition of the willing'" for a global treaty to ban depleted uranium weapons. The resolution "Strongly reiterates its call on all Member States and NATO countries to impose a moratorium on the use of depleted uranium weapons and to redouble efforts towards a global ban, as well as systematically to halt production and procurement of this type of weaponry." It also recommends inclusion of this wording in the European Security Strategy, "the need to give serious thought to the future utility of unguided munitions, as well as cluster bombs, mines and other weapons of indiscriminate effect, such as depleted uranium weapons;" and "not to deploy military and civilian personnel in regions where no guarantee can be given to the effect that depleted uranium has not been, or will not be, used." [See also *Depleted Uranium Environmental Concerns Resurfacing* in November 2007 and other items on this issue in previous environmental security reports.] [May 2008. Military Implications, Sources]

International Convention on Cluster Munitions Adopted by 111 Countries

The Convention on Cluster Munitions was formally adopted by 111 countries in Dublin, Ireland, on May 30, 2008. The Convention is a legally binding instrument that outlaws the use, production, transfer, and stockpiling of cluster munitions, and commits countries to clear areas contaminated by cluster munitions and assist victims and affected communities. The President of the International Committee of the Red Cross, Jakob Kellenberger, urged all countries to adhere to the Convention and noted "these weapons are not only morally unacceptable but also now illegal under international humanitarian law." The Cluster Munitions Convention will be opened for signature in Oslo, December 2-3, 2008, and will enter into force after 30 ratifications. The U.S., China, and Russia did not participate in the meeting. [See also *Negotiations Continue for an International Instrument to Ban Cluster Munitions* in November 2007 and other related items in previous environmental security reports.] [May 2008. Military Implications, Sources]

Non−Proliferation Treaty Deadlock Continues

The second of three sessions of the Preparatory Committee for the 2010 Review Conference of the Parties to the Treaty on the Non−Proliferation of Nuclear Weapons (NPT) was held from April 28 to May 9 at the UN Office at Geneva, Switzerland. Participation included delegates of 106 States parties, representatives of specialized international organizations, and of 64 NGOs. The main issues discussed included: nuclear non-proliferation, disarmament and international security; nuclear-weapon-free zones; nuclear safeguards; the peaceful use of nuclear energy; and the Middle East situation. No special agreements were reached. The third session will be held May 4-15, 2009, and the Review Conference will be April 26–May 21, 2010, both in New York. [See also *Nuclear Nonproliferation Treaty Stalemate Continues* in May 2007, *Review Conference of the Non-Proliferation Treaty* in May 2005, and other related items in previous environmental security reports.] [May 2008. Military Implications, Sources]

Australia to Propose Panel to Advance Work for the NPT Review in 2010

Australian Prime Minister Kevin Rudd announced plans to create an International Commission on Nuclear Nonproliferation and Disarmament to make constructive recommendation for the 2010 Nuclear Nonproliferation Treaty Review Conference. The commission would follow on the work of Australian-led 1996 Canberra Commission and Japan's Tokyo Forum. The first report of the panel is supposed to be presented at a major international conference of experts in Australia late 2009. [See also *Non-Proliferation Treaty Deadlock Continues* in May 2008 and other similar items in previous environmental security reports.] Meantime, the intergovernmental Financial Action Task Force warns that the international community is failing to efficiently control financial transactions that help fund illegal production, technology transfer, and trade of chemical, biological and nuclear weapons. Free-trade zones and transshipment hubs in the Netherlands, Singapore and the UAE are specifically vulnerable sites. [June 2008. Military Implications, Sources]

Biological Weapons Convention Lacks Enforcement Mechanism, Warns Russian General

Col. Gen. Vladimir Filippov, commander of Russia's WMD protection force, warned that the Biological Weapons Convention lacks enforcement mechanisms that would help prevent nations and terrorists from producing biological warfare agents. The issue was also previously raised by the Nonaligned Nations Movement at the 2007 meeting of states parties. The next Meeting of States Parties is scheduled for December 2008 and the review conference of the BWC is planned for 2011. [See also *Progress for Enforcing Biological Weapons Convention* in December 2007 and *Sixth Review Conference of the Biological Weapons Convention* in December 2006 and other related environmental security reports.] [March 2008. Military Implications, Source]

Chemical Weapons Convention Gets New Boost

The Second Review Conference for the Chemical Weapons Convention was held in The Hague, April 7-18, 2008, attended by delegates from 114 of the 183 treaty states. The main issues brought up by participants were: threats posed by the use of chemical weapons by nonstate actors; deadlines for chemical weapons destruction (specifically named were Russia and the U.S., which have to destroy their chemical warfare agents by April 29, 2012, and Japan for destruction of its chemical weapons stockpiles in China); and universal adherence to the treaty. Delegates produced a report that reviews the treaty procedures and implementation issues, and urges the 12 countries that are not yet Party (Angola, the Bahamas, Dominican Republic, Egypt, Guinea-Bissau, Iraq, Israel, Lebanon, Myanmar, North Korea, Somalia and Syria) to join the international disarmament and nonproliferation treaty "as a matter of urgency and without preconditions." The report does not address the convention's relation to some new science and technology developments that could produce new threats—such as development of new incapacitating agents, advances in biology and nanotechnology, and industry verification mechanisms. It was proposed that, from now on, the Scientific Advisory Board of the Organization for the Prohibition of Chemical Weapons meet twice a year, not just once as it has previously. [See also *New Concerns Rising over Chemical Weapons* in April 2007 and other related items in previous environmental security reports.]

In the meantime, Pacific Consultants International warns that Japan is not on schedule for meeting its obligations towards China in the recovery and destruction of hundreds of thousands

of chemical weapons abandoned at the end of World War II and will most probably not meet the April 2012 deadline, due to management problems. [See also *Japanese Chemical Weapons Cleaning in China Yet to be Completed* in June 2007, and other previous environmental security reports on this issue.] [April 2008. Military Implications, Sources]

IMPROVED COMPLIANCE WITH ENVIRONMENTAL REGULATIONS

International Alliance of Forest Peoples

The International Alliance of Forest Peoples was established by the participants in the Peoples of the Forest and Climate Change workshop held in Manaus, Brazil. The scope of the Alliance is to improve international collaboration to guarantee the respect of forest people's rights to land and natural resources and to their traditional livelihoods, facilitate their adaptation to climate change, and improve their participation in the mechanisms for the reduction of emissions from deforestation and forest degradation. The Declaration was signed by 11 countries: Brazil, Ecuador, Colombia, Costa Rica, Guyana, French Guyana, Paraguay, Nicaragua, Venezuela, Suriname, and Panama. Delegations from Africa (Democratic Republic of the Congo) and Asia (Indonesia) and observers from the UN and NGOs from Brazil, England and the U.S. also attended the meeting. [April 2008. Military Implications, Source]

Global Map of Human Impacts to Marine Ecosystems

The first-ever comprehensive atlas showing the impact of human activities on the planet's marine environment is now available online. The international team of scientists combined the impact data of 17 different activities—ranging from fishing and commercial shipping to pollution and climate change—for 20 different marine ecosystems. The database could be used to monitor further future modifications in the global marine environment. The map reveals that while no ecosystem is completely unaffected, human activities had high impact on over 40% of the world's ocean-covered area. The biggest human impact seems to be in the North Sea, the South and East China Seas, the Caribbean, and North America's East Coast. Although the Arctic and the Antarctic areas are the least affected today, scientists are concerned that increased melting of the ice sheets will increase human activities into these areas. [February 2008. Military Implications, Sources]

North American Environmental Atlas Online

The Commission for Environmental Cooperation (CEC) launched the online *North American Environmental Atlas*, http://www.cec.org/naatlas, which allows visualizing significant North American environmental issues at a continental scale. It features the terrestrial ecological regions of North America and interactive thematic maps such as priority conservation areas, renewable energy capacity, and population, as well as links to data and related sources. The Atlas is in continuous development with new features and information to be added in the coming months, and suggestions for making the Atlas the most useful possible are welcome. [February 2008. Military Implications, Source]

Water Footprint Measuring System

On the occasion of World Water Day, reminding of possible conflicts over water, UN Secretary-General Ban Ki-moon urged the international community to create strategies for using water more efficiently and sharing it more fairly. Similarly, researchers suggest that it is timely to use a system to measure water footprint similar to that used for carbon footprint. A symposium held by the UNESCO-IHE (Institute for Water Education) discussed the "virtual water" issue specifically related to the world energy markets. It was pointed out that present practices are not sustainable and therefore it is necessary to introduce a system to measure water footprint in order to help better understand water issues, identify areas with highest impact, and develop adequate policies. Calculating a water footprint might increase awareness and influence practices, similar to the impact that carbon footprint has. [See also *World Leaders Discuss Environmental Security Policies at Davos* in January 2007, *Water Scarcity* in March 2007, *World Water Forum* in March 2006, and other previous environmental security reports on the water issue.] [March 2008. Military Implications, Sources]

Environmental Damage to Be Criminalized in the EU

The Permanent Representatives Committee approved the proposal on the protection of the environment through criminal law. EU national governments will have to apply criminal sanctions to those causing "deliberate or negligent damage to the environment." The list of punishable crimes will include: unlawful discharge of pollutants which could cause "death or serious injury to any person" or "substantial damage" to the environment; illegal waste shipment; killing or possession of protected fauna or flora; significant deterioration of habitats within protected sites; and any action related to ozone-depleting substances. The penalties are left to the discretion of member states as long as they are "effective, proportionate and dissuasive." The Directive is pending final approval by the Parliament and the EU Council, and is expected to enter into force in 2010. [May 2008. Military Implications, Sources]

EC Enforces Compliance with EU Environmental Regulations

Nine EU Member States are being referred to the European Court of Justice for failing to transpose into national law the European Environmental Liability Directive by the April 30, 2007 deadline. On June 1, 2007, the Commission sent a first written warning to 23 Member States; 14 have complied and the nine who did not are: Austria, Belgium (concerning the Brussels region only), Greece, Finland, France, Ireland, Luxembourg, Slovenia and the United Kingdom. [See also European Environmental Liability Directive Came Into Force in April 2007 and EC Enforces Compliance of National Legislation with EU Environmental Regulations in October 2007 environmental security reports.] [June 2008. Military Implications, Sources]

United Arab Emirates Establish Nuclear Agency

The United Arab Emirates' governing Cabinet approved the establishment of the new Nuclear Energy Authority, with "the mandate to evaluate and develop a peaceful nuclear energy program in line with the recommendations of the International Atomic Energy Agency" as part of its civilian nuclear power program. [March 2008. Military Implications, Source]

NEW STANDARDS WITH IMPLICATIONS FOR ENVIRONMENTAL SECURITY

New Standards for Handling Robotic Environmental Equipment

ASTM International has released a new standard, ASTM E2592-07 - "Standard Practice for Evaluating Cache Packaged Weight and Volume of Robots for Urban Search and Rescue", that lays out specific ways to describe requirements for the storage, shipping and deployment of urban search and rescue robots. These recommendations apply equally well to the handling of robotic devices for environmental assessment and cleanup. [February 2008. Military Implications, Sources]

Chemical Emission Certification Extended to Electronic Devices

GREENGUARD Environmental Institute (GEI), the country's largest certifier of chemical emissions from building products and furnishings, is expanding its certification efforts to include computers and other electronic devices. According to an Institute announcement, "The GREENGUARD program measures chemical 'outgassing' of the product during normal use and operation. Measured emissions are then compared to an extensive list of publicly available short term and long term health risk exposure levels available from the US Environmental Protection Agency, Occupational Safety Health Administration, the state of California, and CDC's Registry of Toxic Substances." [March 2008. Military Implications, Source]

SAFETY ISSUES

Chemical and Biological safety issues

Half of Transported European Hazardous Waste Could Be Illegal—How Much More Elsewhere?

Hazardous substances such as ozone-depleting substances and toxic chemicals are increasingly profitable, difficult to tackle, and involve international organized crime. Estimates from the early 2000s suggest that 10-20% of the ozone-depleting substance trade was illegal (a value of $25-60 million). The Basel Convention estimates international hazardous waste movement to be at least 8.5 million tonnes per year. Although it is difficult to estimate the illegal portion of this, a project undertaken in 13 European countries found that over 50% of the waste shipments examined were illegal. One could imagine higher percentages in countries with fewer inspection capabilities and in failed states. E-waste (electronic waste, some of which is hazardous) is growing worldwide. About 70% of it is dumped in developing countries in Asia and Africa. At a recent high-level meeting on enforcement issues held by the World Customs Organization, representatives of the United Nations Environmental Programme (UNEP), customs administrations, and other interested organizations agreed on an Action Plan to improve enforcement and tackle increasing environment crime. The Plan calls for increased detection efficiency by customs offices, creation of environmental crime units, and international co-operation and information exchange. [April 2008. Military Implications, Sources]

Terrorists Could Tap Pharmaceutical Toxins

Old Plagues, New Threats by the Cooperative Nonproliferation Program at the Stimson Center is a comprehensive analysis of the state of monitoring and regulation of emerging products and technologies. It uses the pharmaceutical industry as a case study and outlines the threats—from research and distribution to injection into patients of products derived from select agents. The growing interest in dangerous pathogens and toxins increases the potential of their use in biological weapons by nefarious actors. Lack of adequate regulations increases the possibility of such scenarios. [See also *Accelerating Synthetic Biology Applications Need Better Monitoring and Regulation* in July 2007 and other similar items in previous environmental security reports.] [April 2008. Military Implications, Source]

Methyl Bromide a Continuing International Concern

The Green Party in New Zealand is calling for an immediate halt to methyl bromide fumigation at Wellington's port, after it was learned that the ozone-destroying chemical, regulated under the Montreal Protocol, was being used in the heart of the city. This action, together with the coming into force in January of Indonesia's ban on its import, is likely to increase international attention to the hazards it presents and support for adherence to the Protocol. [See also *Call for Expanding Montreal Protocol on Ozone-Depleting Substances* in September 2007, and other similar items on this issue in previous environmental security reports.] [February 2008. Military Implications, Sources]

Questions on Bisphenol A Risk Raised Again

The Canadian health ministry is said to be ready to declare BPA a dangerous substance, and the US National Toxicology Program, part of the National Institutes of Health, has expressed concern over its effects on the very young. [See also *Possible Risk with Bisphenol A Receiving Increased Attention* in December 2007 environmental security report] [April 2008. Military Implications, Sources]

Nuclear Safety Issues

New Report on Dangers of Radiation Sources

According to announcements, the US National Research Council has released a report, *Radiation Source Use And Replacement*, that "examines the use of high-risk radioactive materials [e.g. cesium chloride] found in medical and research equipment that could be accidentally dispersed or utilized to make a dirty bomb in a terrorist attack." It also "identifies lower-risk alternatives that would not change the performance of the devices, and recommends options to remove and replace the high-risk sources." The National Research Council recommends that U.S. research and medical facilities reduce their use of devices containing cesium chloride and urged U.S. officials to "stop licensing the cesium chlorine irradiators, halt their import and export and promote decommissioning of existing machines." [See also Millennium Project's January 2003 report on this issue: *Commercial radioactive components recognized as "dirty bomb" hazard*.] [February 2008. Military Implications, Sources]

Pandemics and Other Health Issues

Environment and Human Health Integration

Integrating Environment and Human Health, and *Climate, Poverty and Health: Time for Preventive Medicine* published by the National Council for Science and the Environment (NCSE) address the interconnection between human health and environmental components. The recommendations include: interdisciplinary approaches for better integration of environmental and health perspectives; improved communication between environmental and health communities, and between scientists and decision makers and the public; and improving priority setting in science. The NCSE activities in this area are continuing. [March 2008. Military Implications, Sources]

Potential Health and Environmental Threats of Some New Technologies

Nanotechnology

The First Annual Conference on Nanotechnology Law, Regulation and Policy will be held February 28-29 in Washington, DC. The conference will include discussions of whether the FDA will implement its Nanotechnology Task Force Report, how OSHA will address nanotechnology-related issues in the workplace, and how the European and Asian approaches to nanotechnology regulation differ from that of the U.S. The conference is co-sponsored by the Food and Drug Law Institute, and the Woodrow Wilson International Center for Scholars Project on Emerging Nanotechnologies, in partnership with Arizona State University and the Burdock Group.

The UK Institute of Occupational Medicine's SAFENANO Information Service and Community Portal has set up SAFENANO Scientific Services to provide multidisciplinary risk management solutions to companies operating in the nanotechnology industry. The services, planned to assist with safety issues ranging from employees' working conditions to end products, include training, laboratory tasks, and toxicology information update. [January 2008. Military Implications, Source]

The European Commission has adopted a Code of Conduct for Responsible Nanosciences and Nanotechnologies Research, and is recommending to the Member States the adoption of the Code to govern research in this field. The Code is based on seven principles such as sustainability (non-threatening to the present or future environment) and accountability, and provides guidelines for their implementation.

European Commission grants $587,000 to London School of Economics researchers to conduct an international research project on regulating nanotechnologies in the European Union and the United States.

Technology Roadmap for Productive Nanosystems by Foresight Nanotech Institute and Battelle, according to the announcement, "… is a first attempt to map out the R&D pathways across multiple disciplines to achieve atomically precise manufacturing." It provides a detailed technical background for consideration of the environmental problems that might arise during these processes.

Strategy for Nanotechnology-Related Environmental, Health, and Safety Research published February 2008 by the National Science and Technology Council describes the National

Nanotechnology Initiative's (NNI) strategy for addressing priority research on the environmental, health, and safety (EHS) aspects of nanomaterials. The report assigns priorities to research and information needs that were identified in the NSET Subcommittee document Environmental, Health, and Safety Research Needs for Engineered Nanoscale Materials, published on September 21, 2006.

Risks of nanotechnology remain uncertain published in the American Chemical Society's Environmental Science & Technology Online is a comprehensive overview of the current state of nanotechnology risk assessment, emphasizing the paucity of solid scientific results in that important field and giving useful examples and references. [February 2008. Military Implications, Source]

Federal Toxics Disclosure Law Could Provide Data on Nanotechnology Risks. According to a news release, the Project on Emerging Nanotechnologies (PEN) of the Woodrow Wilson Center and the Pew Charitable Trusts has released a legal analysis that finds that EPA's Toxic Release Inventory (TRI) could be applied to the production and commercialization of nanotechnology, although the applicable statute may need to be amended to take care of the special aspects of nanotechnology risk assessment. The report also emphasizes that additional disclosure-related measures for nanotechnology risks should be considered and that "additional research is required to determine whether application of TRI to nanomaterials should be pursued as a policy priority in the near term".

Nanotechnologies at the OECD. According to nanoforum.org, "The OECD has prepared an overview of its work on nanotechnologies for Forum VI of the Intergovernmental Forum on Chemical Safety (IFCS). The paper, titled Nanotechnologies at the OECD, describes the two activities of OECD related to nanotechnologies: i) the activities of the Working Party on Manufactured Nanomaterials (WPMN); and ii) the Working Party on Nanotechnology (WPN)." The stated objective of WPMN is "to promote international co-operation in human health and environmental safety related aspects of manufactured nanomaterials (MN), in order to assist in the development of rigorous safety evaluation of nanomaterials."

Explosivity and Flammability of Nanopowders. An item from nanoforum.org announces a new report on this subject from the NANOSAFE2 project, "One of the main questions asked about nanopowders, when it comes to explosivity and flammability, is: do nanopowders behave like other powders and, as such, can they more readily ignite and explode? During this study, carried out in the frame of the European Nanosafe2 project, safety parameters of nanopowders and their associated techniques and practices have been characterised for a representative set of particles of industrial relevance." It concludes that behavior depends on the materials and surfaces on which nanopowders are applied and hence, "Specific prevention and protection measures should then be taken."

Report Warns of Nano Hazards in Foods. A new report from Friends of the Earth notes that "Untested nanotechnology is being used in more than 100 food products, food packaging and contact materials currently on the shelf, without warning or new FDA testing." and "calls on the FDA to stop the sale of all nano food, packaging, and agricultural chemicals until strong scientific regulations are enacted to ensure consumer safety and until ingredients are labeled." [March 2008. Military Implications, Source]

The EU FP7 (EU's Seventh Research Framework Programme) project "ObservatoryNANO" has begun operation. According to nanoforum.org, it is funded for four years and "will collate

and analyze data regarding scientific and technological (ST) trends and economic realities and expectations. The ST and economic analysis will be further supported by assessment of ethical and societal issues, impacts on health, environment and safety, as well as regulation, standardization, and legislative issues."

New Analysis of Nanotech Risk Assessment Funding by the Project on Emerging Nanotechnologies, analyzing nanotech spending for fiscal year 2006, found that only $13 million—representing less than 1% percent of the $1.4 billion U.S. National Nanotechnology Initiative budget—was spent on federal research projects highly relevant to addressing possible environment, health and safety risks related to nanotechnology. The same year, European countries invested nearly double—$24 million —on similar nanotech risk-assessment projects. Draft legislation proposed by the U.S. House of Representatives Science Committee would require that in the future, a minimum 10% of the NNI budget be devoted to risk assessment research.

The NSTI Nanotech 2008 Conference is scheduled to be held in Boston 1-5 June. Two sessions on "Environmental [sic], Health and Toxicology", including a paper on "Legislative, Regulartory [sic] and Risk Management for Nanotech EHS", are on the program for 5 June. [April 2008. Military Implications, Source]

According to a story in PhysOrg.com, "A major study … in Nature Nanotechnology suggests some forms of carbon nanotubes … could be as harmful as asbestos if inhaled in sufficient quantities." Reporting experiments carried out on mouse tissue, one of the researchers, Prof. Kenneth Donaldson of the University of Edinburgh, stated, "Long, thin carbon nanotubes showed the same effects as long, thin asbestos fibers", causing pathological responses known to be precursors of mesothelioma. The scientists noted that it is still unknown if the tubes can be inhaled and reach sensitive portions of the lungs. [May 2008. Military Implications, Source]

A petition filed by a citizens' coalition with the U.S. Environmental Protection Agency is demanding the agency exercise its pesticides' regulating authority and stop the sale of about 260 products containing nano-silver, due to the compound's possible risks to human health and the environment. The coalition of consumers, health, and environmental groups is led by the nanotech watchdog International Center for Technology Assessment. [May 2008. Military Implications, Source]

The European Commission is planning to launch a large-scale public consultation for raising awareness about nanotechnologies' potentials and at the same time for addressing citizens' concerns about nanotech's possible health and environmental impacts.

Stanley Shaw, a chemical biologist at Massachusetts General Hospital Center for Systems Biology, and his colleagues at the Broad Institute of Harvard and MIT have designed a high-throughput screening method for assessing the biological effects of nanomaterials. The technique uses robotic equipment to place individual nanoparticle types and cell types in various combinations into hundreds of tiny wells in a plate, where an automatic screening system determines the resulting biological effects. Software then analyzes the data, seeking relationships among the different combinations.

The Project on Emerging Nanotechnologies of the Woodrow Wilson Center, in cooperation with the Grocery Manufacturers Association, has issued a report that examines the path of several hypothetical applications of nanotechnology-enabled food packaging through the current

regulations and examines potential future challenges related to this issue. [June 2008. Military Implications, Source]

Underwater Sounds from Human Sources Endangering Marine Life

Sonar Restrictions Debate Continues

Earlier in January, a U.S. District Court judge in Los Angeles ordered clear rules for the U.S. Navy's training with mid-frequency sonar off the coast of Southern California. The restrictions include: a minimum 12-nautical-mile no-sonar zone along the California coastline; shutdown of sonar when marine mammals are spotted within 2,200 yards; mandatory monitoring for marine mammals one hour prior to sonar exercises; and aerial surveillance prior to and during the exercise. However, later in the month, President Bush overruled the Court's decision and signed an exemption for the Navy to use sonar in its training, then a federal judge temporarily lifted certain measures, and the Navy has resumed sonar training off the coast of Southern California. [See also *U.S. to Study Sonar Impact on Marine Mammals* in May 2007, and other previous environmental security reports on the same issue.] [January 2008. Military Implications, Sources]

POLLUTION ISSUES

Greenhouse Gas Emissions

Scientists at the Mauna Loa observatory in Hawaii found that the levels of CO_2 are at least 34% higher than pre-Industrial Revolution levels and near the suspected climate-tipping point of 400 ppm. They note that the rise was 2.14 ppm in 2007, while from 1970 to 2000 the concentration rose by an average of about 1.5 ppm each year.

"Present global mean CO_2, 385 ppm, is already in the dangerous zone" and "prompt policy changes" are needed, suggests the *Target Atmospheric CO2: Where Should Humanity Aim?* paper by a group of scientists led by Jim Hansen, director of the NASA Goddard Institute for Space Studies. Based on an analysis of paleoclimate data and ongoing climate change, the authors argue that CO_2 should be reduced to a maximum of 350 ppm in order to avoid reaching irreversible tipping points and maintain the Earth conditions supporting life as we know it. The main policy suggestions include increasing efforts to find energy sources beyond fossil fuels, and ending fossil fuel exploitation and use without adequate CO_2 capture and sequestration. The ultimate task is phaseout over the next 20-25 years of coal plants that are not equipped with carbon sequestration technology. The paper admits that establishing a clear time frame of climate change is difficult, since the models are still deficient. Nevertheless, it underlines the urgency of the situation and concludes that although the task of curbing man-made CO_2 emission is difficult, it is "feasible when compared with the efforts that went into World War II."

The *State and Trends of the Carbon Market 2008* report of the World Bank shows that the global carbon market grew to $64 billion in 2007, more than double the 2006 level. The European Union Emission Trading Scheme (EU ETS) also saw a doubling of both value and number of allowances transacted. [May 2008. Military Implications, Sources]

Restrictions on Plastic Bags Expanding

More than 40 jurisdictions around the world have imposed or are considering restrictions or taxes on plastic bags. China is outlawing plastic bags from all public transportation, prohibits their free distribution at shopping points, bans the production and use of ultra-thin (less than 0.025 mm) non-biodegradable plastic bags, and will establish new criteria for the production of plastic bags. Firms not complying will face penalties. The new regulation will come into effect on June 1, 2008. Similar regulations were introduced in Bangladesh, Uganda, and South Africa. The Australian Federal Environment Minister announced intentions to phase out plastic bags by the end of the year and, according to UNEP, the problem is also on the agenda of almost every African country. [See also *Plastic Bags Taxed and/or Banned* in October 2005 environmental security report.] [January 2008. Military Implications, Sources]

NEW INITIATIVES AIMING TO INCREASE ECO-EFFICIENCY

New International Financial Alliance to Support Biodiversity

Representatives of 191 Parties to the Convention on Biological Diversity and over 100 ministers met in Bonn to improve the set of rules that help protect biodiversity. Plant and animal species are being lost at a rate between 100 and 1000 times the natural extinction rates. One of the results of the meeting was the establishment of Life Web as a financing mechanism for protected areas. So far, more than 60 Parties have made financial pledges. For example, German Chancellor Angela Merkel pledged 500 million Euros for forest protection up to 2012 and 500 million Euros a year after that. [May 2008. Military Implications, Sources]

State of Green Business 2008

The *State of Green Business* report provides an example of a set of evaluations of environmental accomplishments. It takes stock of green business activities in the United States, and features the debut of the GreenBiz Index, a set of 20 indicators of green business progress that measures how efficiently companies are using resources, reducing toxics, purchasing green fleet vehicles and renewable power, and reporting social and environmental performance. It also features ten key green business trends of 2007 as well as lists of books, websites, reports, business initiatives, and other resources of the past year. [February 2008. Military Implications, Source]

New "Green IT" Software under Development

A group at Oxford University's Environmental Change Institute started development of "software that is free and easy to download, which will make networked computers more energy-efficient and reduce carbon emissions by saving on electricity needs." The software will eventually be available from the project website: http://projects.oucs.ox.ac.uk/lowcarbonict. [March 2008. Military Implications, Sources]

Energy/Performance Benchmark for Workstations under Development

A new, environmentally-oriented project of the Standard Performance Evaluation Corporation (SPEC) Graphics and Workstation Performance Group is "working on the benchmark for performance in relation to power consumption, incorporating current benchmarks for 3D

graphics as well as looking at workloads for rendering, financial modeling, video encoding and other processes" announced a *Greener Computing* news story. SPEC will be submitting the benchmark to EPA for use in its Energy Star rating system. [March 2008. Military Implications, Source]

Environmentally Friendly City in UAE Offers Cooperation Opportunity

A new mini-municipality, Masdar City, being built adjacent to Abu Dhabi, is intended as a hub for academic and corporate research on nonpolluting energy technologies, according to an article in the International Herald Tribune. The walled city of 2.3 square miles will be car-free and produce all its own energy from sunlight. [February 2008. Military Implications, Source]

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3. Military Implications and Sources

A Preventing or repairing military damage to the environment

ENVIRONMENTAL SECURITY RISES ON THE INTERNATIONAL POLITICAL AGENDA

Environmental Ministers Advance Global Consensus at UNEP Forum

Military Implications:
The military should respond to UNEP's increased focus on partnerships and linkages with other organizations by exploring alternative scenarios for a global alliance between UNEP and the world's national militaries to improve environmental security.
Sources:
New and Forward Looking Strategy for UNEP Authorized
http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=528&ArticleID=5752&l=en
10th Special Session of the Governing Council /Global Ministerial Environment Forum
http://www.unep.org/gc/gcss-x/
Final Report: Mid-Term Strategy for the Period 2010-2013
http://www.emwis.net/thematicdirs/news/PDF/MTS_Final_Draft

Briefings on Environmental Security at NATO Conference

Military Implications:
The papers and PowerPoint presentations should also be reviewed and circulated to relevant military personnel. If not already done, the *Army Strategy for the Environment* should be shared with the participants in this Forum, seeking opportunities for joint implementation of the international aspects and offering the Strategy as a model for other NATO nations.
Sources:
NATO Security Science Forum on Environmental Security
http://www.nato.int/docu/comm/2008/0803-science/0803-science.htm
NATO-Russia Council Concludes 2008 Bucharest Summit
http://www.america.gov/st/peacesec-english/2008/April/20080404162813idybeekcm0.9275629.html

World Leaders Discuss Environmental Security Policies at Davos

Military Implications:
If clean water for human survival were to become a human right, how might military-to-military program priorities and training be altered to support that objective? The World Economic Forum conference has increased attention to environmental security cooperation between business and government. Military personnel with environmental security responsibilities should explore collaboration possibilities at the business-government interface to create roadmaps and design strategies to address the environmental aspects that might have security implications.
Sources:
World Economic Forum Annual Meeting 2008
http://www.weforum.org/en/events/annualmeeting2008/index.htm

Ban warns business on looming water crisis
http://www.ft.com/cms/s/8ca7e9c6-cadb-11dc-a960-000077b07658.html
Time is Running Out for Water (video)
http://gaia.world-television.com/wef/worldeconomicforum_annualmeeting2008/default.aspx?sn=22493&lang=en
Fukuda unveils new climate strategy
http://search.japantimes.co.jp/cgi-bin/nn20080127a1.html
Fukuda faces post-Kyoto balancing act
http://search.japantimes.co.jp/cgi-bin/nn20080128a4.html

Branson calls for War Room on Climate Change at the United Nations

Military Implications:
The military should consider how it might participate in the creation of such a war room and its potential liaison protocols, and then contact Virgin Unite to determine appropriate modes of participation.
Sources:
Press Conference on General Assembly Climate Change Thematic Debate
http://www.un.org/News/briefings/docs/2008/080211_Climate_Change.doc.htm
'War room' to Battle Warming Proposed
http://www.msnbc.msn.com/id/23129533
Email traffic between Virgin Unite's CEO and J. Glenn (Millennium Project) who was a special guest of the President of the UN General Assembly during the Climate Change session.

INTERNATIONAL TREATIES RELATED TO ENVIRONMNETAL SECURITY AND MILITARY ACTIONS

African Countries Call for International Ban on Cluster Bombs

Military Implications:
[Same as previous on this issue] The military should be prepared for possible requirements to phase out cluster munitions use and to intensify efforts for helping other countries and regions do the same and/or deal with their aftereffects.
Sources:
Strong Landmark African Declaration to Ban Cluster Bombs - Only South Africa Calls for Exceptions to the Ban
http://www.icbl.org/news/zambia_pr
The Cluster Munitions Process http://www.clusterprocess.org

Chemical Weapons Convention Gets New Boost

Military Implications:
[Similar to previous on the same issue] Those with responsibilities in this area should: 1) consider assessing national and international opportunities for assisting in compliance and improving effectiveness of the CWC regulations, and 2) stress attention to and inclusion of new threats.
Sources:
Second Review Conference
http://www.opcw.org/rc2/index.html

Nations Demand Adherence to CW Disposal Deadlines
http://204.71.60.36/d%5Fnewswire/issues/2008/4/8/9cb5bc8a%2D5136%2D4594%2Da750%2Dc5108a7b58ec.html
Chemical arms disposal pricey / China project hit for opaque management, exorbitant costs
http://www.yomiuri.co.jp/dy/national/20080424TDY02307.htm
Japan's efforts toward early destruction of ACW in China
http://www.opcw.org/docs/csp/rc2/en/rc2nat20(e).pdf

NATIONAL/REGIONAL ENVIRONMENTAL STRATEGIES AFFECTING MILITARY ACTIVITIES

North American Environmental Security Action Plan

Military Implications:
Relevant military personnel should study the new chemicals management agenda for eventual implications emerging from the inclusion of new compounds to the list and changes to the reporting procedures, assessment of emissions and discharges. Also, the *Environmental Outlook* might give indications on environment-related security priorities.
Sources:
Fifteenth Regular Session of the CEC Council
http://www.cec.org/calendar/details/index.cfm?varlan=english&ID=2097
North America 2030: An Environmental Outlook
http://www.cec.org/outlook/
Sound Management of Chemicals
http://www.cec.org/programs_projects/pollutants_health/project/index.cfm?projectID=25&varlan=english

European Commission's New Low-carbon 20/20/20 by 2020 Energy Plan

Military Implications:
The military should follow the outcomes of these proposals that might result in new environmental regulations and new standards policies, and consequently emerging strategies. The aim would be to ensure that military activities could adjust to any new requirements in Europe.
Sources:
January 2008:
José Manuel Durão Barroso, President of the European Commission 20 20 by 2020: Europe's Climate Change Opportunity Speech to the European Parliament, Brussels, 23 January 2008
http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/08/34&format=HTML&aged=0&language=EN&guiLanguage=en (Free registration required.)
Stavros DIMAS, Member of the European Commission, responsible for environment Climate action, Energy for a changing world, Press conference, Wednesday, 23 January 2008
http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/08/37&format=HTML&aged=0&language=EN&guiLanguage=en (Free registration required.)
EU unveils comprehensive climate and energy package
http://euobserver.com/9/25513/?rk=1
Brussels considering climate tax on imports
http://euobserver.com/9/25400/?rk=1

March 2008:
EU to commit to tight legislative deadline for green goals
http://euobserver.com/9/25832/?rk=1
Brussels defends EU burden-sharing on climate change
http://euobserver.com/9/25829/?rk=1
Brussels to grant some concessions to industry in environment proposals
http://euobserver.com/9/25839/?rk=1

Russian Focus on Environmental Security

Military Implications:
Environmental security could form the focus of US-Russian military cooperation bilaterally and internationally. Relevant military personnel should explore what steps need to be taken to move in that direction.
Sources:
Russian leader says environment problems a security threat
http://afp.google.com/article/ALeqM5gRd76iVIzDU1XjWGgoUw0ShP-xhw

New Construction on Mediterranean Coastlines to be Banned

Military Implications:
Military personnel involved in environmental security issues and operations in the Mediterranean arena should study the new regulations and directives of the Barcelona Convention to ensure cooperative compliance with the new requirements in accordance with other agreements, such as international conventions and Status of Forces Agreements.
Sources:
Barcelona Convention and Mediterranean Action Plan: First-ever Legally-binding International Instrument on Coastal Zone Management Adopted
http://www.unepmap.org/index.php?module=news&action=detail&id=30
Barcelona Convention: Compliance System Established to Support Legal Framework and Actions
http://www.unepmap.org/index.php?module=news&action=detail&id=28
Mediterranean nations pledge restraints on coastal development
http://www.csmonitor.com/2008/0122/p04s02-woeu.html

EU, Latin American and Caribbean Countries Environment Cooperation

Military Implications:
With the high priority EU gives to environmental regulations, it is reasonable to expect new regulations to increase environmental protection in the LAC region. Relevant military personnel should follow the outcomes of the May Lima Summit and identify opportunities for applications of the Army Strategy on the Environment to hemispheric security.
Source:
First ever meeting of environment ministers from EU and Latin America and Caribbean countries held in Brussels
http://europa.eu/rapid/pressReleasesAction.do?reference=IP/08/381&format=HTML&aged=0&language=EN&guiLanguage=en

Argentina Redeploys Military to Defend Water and Oil

Military Implications:
In addition to recognizing the increased role natural resources are playing in possible conflicts, Argentina's "Plan 2025" might establish new protected or controlled areas that are important for planning future international actions in Argentina.
Sources:
Argentina's New War Doctrine for Resources
http://visionesalternativas.com/article.asp?ID=%7bA7C2A077-ED2E-4B52-B75B-AEAE8AA0713F%7d%29&language=EN (by subscription only)
The Ugly American Environmentalist
http://www.time.com/time/world/article/0,8599,1595221,00.html
Eco-millionaire's land grab prompts fury
http://www.guardian.co.uk/argentina/story/0,,2005494,00.html

US-Uruguay Treaty on S&T Cooperation

Military Implications:
The agreement should be reviewed for military-to-military assistance and training opportunities to support environmental research that could reduce the military environmental footprint, and for other environmental security considerations.
Source:
The United States and Uruguay Sign a Science and Technology Cooperation Agreement
http://www.state.gov/r/pa/prs/ps/2008/apr/104151.htm

Iran and Iraq Sign Environment Protection Agreement

Military Implications:
The Iranian–Iraqi environmental agreement might be another example where environmental diplomacy could foster peace in a conflict-torn region. U.S. military plans, training, and other military-to-military assistance should be updated to take this agreement into account.
Source:
Iran, Iraq ink agreement on environment protection
http://news.xinhuanet.com/english/2008-01/27/content_7506876.htm

Israel to Participate in UNEP and UN HABITAT

Military Implications:
Israel's participation in UNEP and UN–HABITAT deliberations might bring important environmental security benefits to the vulnerable Middle East region. Appropriate military liaisons should consider contacting their counterparts in the Israel Defense Forces to offer the benefit of US experience in the area of military participation in environmental security activities.
Source:
Israel gets seats on United Nations agency panels
http://www.jpost.com/servlet/Satellite?cid=1198517288600&pagename=JPost%2FJPArticle%2FShowFull

Waste Disposal a Matter of Discord or Cooperation between Palestine and Israel

Military Implications:

Military liaisons assisted by military personnel with toxic waste management experience should explore opportunities for assistance and applying the Army Strategy for the Environment.
Source:
Apart from the security problems
http://www.haaretz.com/hasen/spages/960889.html

China's New Ministry of Environmental Protection

Military Implications:
China's growing environmental problems could cause a variety of socio-economic instability conditions nationally and internationally, resulting in major environmental security issues for many countries around the world to address. Relevant military personnel should consider increased cooperation with their Chinese counterparts on environmental security matters that could assist the new Ministry of Environmental Protection.
Source:
China's parliament adopts government reshuffle plan
http://www.chinadaily.com.cn/china/2008npc/2008-03/15/content_6538946.htm
China announces 'super-ministries', including one for environment
http://afp.google.com/article/ALeqM5giPUHFKPnbJWleDQdRstP-tEg-0w
Environment chief vows to add muscle
http://www.chinadaily.com.cn/bizchina/2008-03/25/content_6563818.htm

Environmental Courts Established in the Philippines

Military Implications:
Military personnel responsible for environmental compliance in the Philippines should become familiar with these new tribunals in order to assess their possible effects on environmental obligations related to military activities and to their contractors.
Source:
SC designates 117 environment courts
http://newsinfo.inquirer.net/inquirerheadlines/nation/view/20080114-112156/SC_designates_117_environment_courts

Nigerian Government Resolves to Push Effective Environmental Enforcement

Military Implications:
Appropriate personnel from AFRICOM should contact NESREA to explore potential military-to-military assistance in environmental security. This could also be a potential area for US-China military cooperation, due to China's increasing role in Nigeria.
Source:
'FG to ensure healthy environment'
http://www.thetidenews.com/article.aspx?qrDate=02/13/2008&qrTitle=%E2%80%98FG%20to%20ensure%20healthy%20environment%E2%80%99&qrColumn=ENVIRONMENT

TECHNOLOGICAL BREAKTHROUGHS WITH ENVIRONMENTAL SECURITY IMPLICATIONS

Computer Technology and Robotics

Google to Support Development of Early Warning System in Vulnerable Regions

Military Implications:
Relevant military personnel should keep track of the grantees as potential collaborators to improve environmental security. A network of local communities that is able to "predict and prevent" crises could play important roles in enhancing environmental security. Someone at the Deputy Assistant Secretary level might contact Google.org to offer collaboration where possible to improve the effectiveness of grantees' efforts and to share insights.
Sources:
Google.org Announces Core Initiatives to Combat Climate Change, Poverty and Emerging Threats
http://www.google.com/intl/en/press/pressrel/20080117_googleorg.html
Google.org expands funding to attack world crises
http://www.reuters.com/article/latestCrisis/idUSN17226771
$25 Million Begins Google's Charity
http://www.washingtonpost.com/wp-dyn/content/article/2008/01/17/AR2008011703049.html

New Detection and Cleanup Techniques

Nanotube-based Biosensor Sensitive to Trace Amounts

Military Implications:
The military should investigate this product for its usefulness in testing possibly contaminated environments.
Sources:
NASA Nanotechnology-Based Biosensor Helps Detect Biohazards
http://www.nasa.gov/centers/ames/news/releases/2008/08_45AR.html
Early Warning (the company)
http://www.earlywarninginc.com/early-warning-profile.php

Emerging Contaminants: Most Effective Treatment Strategies

Military Implications:
Military utility managers and water supply contractors, as well as preventive health authorities should follow developments on this topic in order to respond to any new regulatory and operational requirements that might arise.
Sources:
Oppenheimer, J., R. Stephenson, and J. Decarolis, Emerging contaminants:Insights to the most effective EDC and PPCP treatment strategies, AWWA Opflow, May 2008, pp. 12-16.
Conference session added to address microconstituents
http://www.awwa.org/publications/MainStreamArticle.cfm?itemnumber=35946

Nanowire "Paper" Selectively Absorbs Oils in Water

Military Implications:
The military should investigate this material for its application in the cleanup of oil and other pollutants from the environment.
Source:
Researchers develop nanowire 'paper towel' for oil spills
http://www.physorg.com/news131372301.html

Carbon-gold Nanoparticle Sacs Trap Oil Droplets

Military Implications:
The military should follow development of this technology as it may become applicable to removing pollutants from water in the environment.
Source:
Elongated Nanoparticles Called Nanobatons Self Assemble Around Oil Droplets for Cleaning Oils Spills and Polluted Water
http://www.azonano.com/news.asp?NewsID=6521

More New Improvements in Nanotube-based Environmental Sensors

Military Implications:
The military should investigate this technology for its usefulness in testing possibly contaminated environments.
Source:
Using carbon nanotubes, MIT chemical engineers have built the most sensitive electronic detector yet for sensing deadly gases such as the nerve agent sarin
http://www.physorg.com/news131977245.html

Chemical Agent Cleanser Developed in Canada

Military Implications:
The military should investigate the applicability of this new decontamination system.
Sources:
"Green" method decontaminates deadly nerve agents
http://qnc.queensu.ca/story_loader.php?id=47fb870ea02f1
New nerve agent cleansing method created
http://www.upi.com/NewsTrack/Science/2008/04/15/new_nerve_agent_cleansing_method_created/8254/

Animal-Robot Team Effective for UXO Clearance

Military Implications:
The military should investigate the advantages of this improved partnership technique for post-conflict cleanup. However, use of the mongoose, a species alien to most nations, must be accompanied by precautions to prevent feral breeding and endangerment of local species and the spread of rabies. Use of a single sex or neutering might be the solution to problems, such as were created decades ago by introduction of the mongoose to control snakes and rats in Grenada.
Sources:

Mongoose-robot duo sniff out landmines on the cheap
http://technology.newscientist.com/channel/tech/mg19826535.900?DCMP=NLC-nletter&nsref=mg19826535.900
Video of the mongoose and robot pair sniffing our landmines
http://uk.youtube.com/watch?v=fSQpzh02JaA
Giant Hero Rats Being Trained to Sniff Out Land Mines
http://www.buzzle.com/articles/giant-hero-rats-being-trained-to-sniff-out-land-mines.html
Trained Rats Sniff out TB, Land Mines in Tanzania
http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICAEXT/TANZANIAEXTN/0,,contentMDK:21462478~menuPK:287357~pagePK:141137~piPK:141127~theSitePK:258799,00.html

Miniature Chemical Agent Sensor

Military Implications:
The military should explore these research programs for their potential use in improving environmental analysis.
Sources:
MIT gas sensor is tiny, quick. Energy-efficient device could quickly detect hazardous chemicals
http://web.mit.edu/newsoffice/2008/micro-analyzer-0110.html

New Rapid Portable Chemical Sensor

Military Implications:
Since repercussions of hazardous chemicals know no boundaries, the military should consider sharing such devices with civilian and international military counterparts to reduce international environmental and health threats from the use of chemical agents and accidental releases of hazardous industrial substances and for use in discovering and delineating contaminated sites.
Source:
BYU scientist creates chemical detector
http://www.deseretnews.com/article/1,5143,695263396,00.html

Model Helps Evaluate Performance of Biosensors

Military Implications:
The military should explore these research programs for their potential use in improving environmental analysis.
Sources:
Model Is First to Compare Performance of 'Biosensors'
http://www.sciencedaily.com/releases/2008/01/080102134121.htm

Reusable Carbon Aerogel Adsorbs Organic Solvent Pollutants

Military Implications:
The military should investigate these materials for their use in systems for personal protection devices and for cleaning up polluted environments.
Source:
Creation of a new material capable of eliminating pollutants by the hydrocarbon industry
http://www.eurekalert.org/pub_releases/2008-02/udg-coa022608.php

Water Purification Techniques

Military Implications:
The military should investigate the usefulness of these advances for providing clean water for conflict, post-conflict, and humanitarian disaster environments.
Sources:
Bacteria and nanofilters — the future of clean water technology
http://research.nottingham.ac.uk/NewsReviews/newsDisplay.aspx?id=444
Cleaner water through nanotechnology
http://www.physorg.com/news122733688.html

New Approach May Ease Uranium Decontamination

Military Implications:
The military should follow this research in order to be ready to apply any resulting practical methods to post-conflict environmental cleanup.
Sources:
'Pac-Man' molecule chews up uranium contamination
http://environment.newscientist.com/article/mg19726396.200?DCMP=NLC-nletterbanner&nsref=mg19726396.200

New Material Strips out Radioactive Debris

Military Implications:
The military should follow this work to assess its applicability to cleanup of radioactive contamination.
Source:
Compound removes radioactive material from power plant waste
http://www.anl.gov/Media_Center/News/2008/news080313a.html

New Type Nanoscale Transistor Would Aid DNA Detectors

Military Implications:
The military should follow the development of this component for its possible applicability in nanotech-based biological monitoring systems for the environment.
Source:
A handheld DNA detector may soon be a reality
http://www.topnews.in/health/handheld-dna-detector-may-soon-be-reality-21411

Chemical Tests on Cells Rather than Animals

Military Implications:
The military should explore the usefulness of this work in the development of biosensors for environmental analysis and participate in the development of these new approaches with the civilian scientific agencies.
Sources:
Agencies to Change How Chemicals are Tested for Safety
http://nationalacademies.org/headlines/20080219.html

NIH Collaborates with EPA to Improve the Safety Testing of Chemicals
http://www.nih.gov/news/health/feb2008/nhgri-14.htm
Toxicity Testing in the 21st Century: A Vision and a Strategy
http://www.nap.edu/catalog.php?record_id=11970

Technologies that Could Trigger New Forms of Arms Race

Future Proliferation of Autonomous Ground and Air Robot Weapons

Military implications:
The distinctions between future systems of nanosensors to detect chemical, biological, and radiological presence and future support for ground and air robotic weapons could become blurred. Since it is likely that one day there will be an international agreement governing the use of robot weapons, the military should develop language to distinguish between defensive early warning or detection systems vs. offensive robot weapons and their support systems.
Sources:
Killer Military Robots Pose Latest Threat To Humanity, Robotics Expert Warns
http://www.sciencedaily.com/releases/2008/02/080226213451.htm
Robot wars 'will be a reality within 10 years'
http://www.telegraph.co.uk/earth/main.jhtml?xml=/earth/2008/02/27/scirobots127.xml

Promissing Environmental-friendly Technologies

All-Electric cars coming from Norway and China with More than Hundred Mile Ranges

Military Implications:
If DARPA does not already have more efficient batteries in R&D now, then the military should evaluate the Norwegian and Chinese batteries for retrofitting military equipment using large-battery power.
Sources:
BYD Company www.byd.com
China's BYD Auto Co. to Unveil All-Electric Car
http://online.wsj.com/article/SB120849294773525787.html
Kleiner Perkins Venture to Sell Electric Car in US
http://www.planetark.com/dailynewsstory.cfm/newsid/48084/story.htm

New Solar Cell Design Raises Efficiency

Military Implications:
The military should follow evolution of this solar cell technology for implementation to improve materiel power systems and to reduce the military environmental footprint.
Sources:
MIT spinoff shoots for solar power at $1 per watt
http://www.news.com/8301-11128_3-9903728-54.html
MIT spin-off plans to manufacture cheap, efficient solar cells
http://www.physorg.com/news125842769.html

New Lithium-ion Battery Offers Multiple Advantages

Military Implications:
The military should investigate the use of this battery design, both to reduce the environmental footprint of military vehicles and in power supplies for portable and mobile environmental monitoring systems.
Sources:
An Electrifying Startup. A new lithium-ion battery from A123 Systems could help electric cars and hybrids come to dominate the roads (note: requires free registration to access article)
http://www.technologyreview.com/read_article.aspx?ch=specialsections&sc=batteries&id=20570&a=

Improved Solar Cell Promised in a Year

Military Implications:
The military should follow the development of these improved power sources for their possible use in environmental surveillance systems and other military applications.
Sources:
Start-up: Affordable solar power possible in a year
http://www.usatoday.com/money/industries/energy/environment/2008-04-28-solar-power-sunrgi_N.htm
SUNRGI Company: http://www.sunrgi.com
IBM today announced a research breakthrough in photovoltaics technology that could significantly reduce the cost of harnessing the Sun's power for electricity
http://physorg.com/news130086323.html

New Inter-electrode Material Yields 50% Fuel Cell Power Increase

Military Implications:
The military should follow this development as it carries on into commercial application in power supplies for a variety of purposes, including environmental equipment.
Sources:
More-Powerful Fuel Cells
http://www.technologyreview.com/Energy/20813/page1/
MIT Creates New Material For Fuel Cells, Increases Power Output By 50 Percent
http://www.physorg.com/news130078922.html
Chemical Engineer Discovers Way of Increasing Battery Life with Environmentally Friendly Fuel Cells
http://www.physorg.com/news126194529.html

Formic Acid Provides New Fuel Cell Medium

Military Implications:
The military should follow this development for its applicability to power supplies for military systems and mobile environmental monitoring devices.
Source:
Hydrogen Fuel from Formic Acid
http://www.technologyreview.com/Energy/20778/?a=f

New Insight into Methane-converting Catalyst

Military Implications:
Although R&D remains to be done to exploit this new information, the military should establish and maintain contact with the work in order to be able to apply it to the reclamation of methane from sewage treatment plants and solid waste landfills that would otherwise pollute the environment.
Source:
Halting methane squanderlust
http://www.physorg.com/news130592381.html

New Low Power Chip Suitable for Tiny Environmental Sensors

Military Implications:
The military should investigate this development for use in environmental sensing systems.
Source:
Microchip sets low-power record with extreme sleep mode
http://www.physorg.com/news132583292.html

New Material for Storing Hydrogen

Military Implications:
Although the investigators say that it is critical to note that their work is at a very early stage, the military should follow this development in environment-friendly energy as it progresses toward a stage of practical application.
Source:
Physicists find new material for storing hydrogen
http://physicsworld.com/cws/article/news/33614 (Registration required)

New Capacitor Promises 100× Improvement over Batteries in Charge/Weight Ratio

Military Implications:
The military should investigate these developments for their positive energy-saving effects on the environmental footprint of military installations and utility in deployable systems. DOD is aware of the Sunlight to Petrol (S2P) project through its funding of the project by DARPA; however, it is included to notify the broader environmental security community.
Source:
Lockheed Martin Signs Agreement with EEStor
http://www.gm-volt.com/2008/01/10/lockheed-martin-signs-agreement-with-eestor

Bacteria-Generated Electricity from Waste to Power Fuel Cell

Military Implications:
The military should investigate these developments for their positive energy-saving effects on the environmental footprint of military installations and utility in deployable systems. DOD is aware of the Sunlight to Petrol (S2P) project through its funding of the project by DARPA; however, it is included to notify the broader environmental security community.
Source:

New insights into fuel cell that uses bacteria to generate electricity from waste
http://www.biodesign.asu.edu/news/new-insights-into-fuel-cell-that-uses-bacteria-to-generate-electricity-from-waste

New Sunshine Distribution System Provides Energy-free Lighting

Military Implications:
The military should investigate these developments for their positive energy-saving effects on the environmental footprint of military installations and utility in deployable systems. DOD is aware of the Sunlight to Petrol (S2P) project through its funding of the project by DARPA; however, it is included to notify the broader environmental security community.
Sources:
Solatube International, Inc.: http://www.solatube.com/commercial/faqs.php
Solatubes: Power-free lighting solution
http://www.enn.com/top_stories/article/28447

Converting CO_2 into Fuels using Sunshine

Military Implications:
The military should investigate these developments for their positive energy-saving effects on the environmental footprint of military installations and utility in deployable systems. DOD is aware of the Sunlight to Petrol (S2P) project through its funding of the project by DARPA; however, it is included to notify the broader environmental security community.
Source:
Sandia's Sunshine to Petrol project seeks fuel from thin air
http://www.sandia.gov/news/resources/releases/2007/sunshine.html

New Project for Nanowire Solar Cells

Military Implications:
The military should investigate these developments for their positive energy-saving effects on the environmental footprint of military installations and utility in deployable systems. DOD is aware of the Sunlight to Petrol (S2P) project through its funding of the project by DARPA; however, it is included to notify the broader environmental security community.
Source:
Nanowires hold promise for more affordable solar cells
http://www.physorg.com/news120474984.html

NanoRadio Offers Low Impact Environmental Monitoring and Communications

Military Implications:
The military should follow this work as it progresses toward applicability to fieldable environmental surveillance systems for both battlefield monitoring and environmental management.
Source:
TR10: NanoRadio
http://www.technologyreview.com/read_article.aspx?ch=specialsections&sc=emerging08&id=20244

New Technique Might Power Nano-based Environmental Devices

Military Implications:
Although this work is at an early stage, the military should follow its further development as it might apply to power sources for nanotechnology-based environmental surveillance devices and augmenting electrical requirements on uniforms and portable equipment.
Source:
Microfibre–nanowire hybrid structure for energy scavenging
http://www.nature.com/nature/journal/v451/n7180/abs/nature06601.html

Ionic Liquids Provide Safe Alternative to Mercury

Military Implications:
Considering the call for a global ban on mercury, the military should investigate the use of these compounds as environmentally friendly substitutes to possibly hazardous materials, including mercury.
Source:
New ionic liquid in thermometers beats mercury on range, performance and safety
http://www.rsc.org/AboutUs/News/PressReleases/2008/ILThermometers.asp

B. Preventing or Responding to Environmentally Caused Conflicts

SECURITY IMPLICATIONS OF CLIMATE CHANGE

Increased Role of the Military in Environment-related Crises

Military Implications:
Since this meeting furthered regional military cooperation on environmental security, the US Army's Strategy for the Environment should be evoked during follow-up environmental crises-management planning in the region. US Secretary of Defense Gates addressed the conference, saying that the US plays a role "as an agent of professionalism and capacity in service to a range of non-military needs, such as disaster response."
Sources:
The IISS Shangri-La Dialogue
http://www.iiss.org/conferences/the-shangri-la-dialogue/
Channel News Asia - Ministers say military a crucial element that can help in humanitarian crises
http://www.iiss.org/whats-new/iiss-in-the-press/june-2008/ministers-say-military-a-crucial-element-that-can-help-in-humanitarian-crises/
Environmental approach to security
http://nation.ittefaq.com/issues/2008/06/02/news0257.htm
Singapore: Food Prices 'May Cause Wars'
http://foodsecurity.developmentgateway.org/News.10971+M524b934499e.0.html

International Security Responses to a Climate Changed World

Military Implications:
The report appears be a good information source for security sector actors who have to prepare contingency plans to respond to the challenges of climate change.
Sources:
Delivering Climate Security: International Security Responses to a Climate Changed World
http://www.informaworld.com/smpp/title~content=g792406239~db=mass
Climate change 'may put world at war'
http://www.telegraph.co.uk/earth/main.jhtml?xml=/earth/2008/04/23/eaclimate123.xml

National Security Implications of Global Climate Change Through 2030

Military Implications:
The military will most probably be called on to include the findings of this and other similar works into its planning.
Sources:
National Intelligence Assessment on the National Security Implications of Global Climate Change to 2030
http://www.dni.gov/testimonies/20080625_testimony.pdf
Climate change may challenge national security, classified report warns
http://www.eurekalert.org/pub_releases/2008-06/teia-ccm062408.php

An Uncertain Future: Law Enforcement, National Security and Climate Change

Military Implications:
Relevant military personnel should study the report for its comprehensive analysis and the multi-faceted perspective of security implications of climate change, including changes in planning, funding and priorities.
Sources:
An Uncertain Future: Law Enforcement, National Security and Climate Change
http://www.oxfordresearchgroup.org.uk/publications/briefing_papers/uncertainfuture.php
http://www.oxfordresearchgroup.org.uk/publications/briefing_papers/pdf/uncertainfuture.pdf (report)
New security threats caused by climate change
http://www.telegraph.co.uk/earth/main.jhtml?xml=/earth/2008/01/23/eaclimate123.xml
Armed Forces Face Strain of Climate Change – Report
http://www.planetark.com/dailynewsstory.cfm/newsid/46590/story.htm

Security Implication of Climate Change to the EU

Military Implications:
Although with specific recommendations for the EU, the report is a good overview of the security implications of climate change that apply similarly to North America. Relevant military personnel should review the report for possible inputs for U.S. strategy.
Sources:
Climate Change and International Security. Paper from the High Representative and the European Commission to the European Council
http://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/reports/99387.pdf
EU must boost military capabilities in face of climate change
http://euobserver.com/9/25811/?rk=1

UNEP's Year Book 2008

Military Implications:
As one of the most authoritative reports on environmental issues, it provides indications of UN priorities and eventual possible international regulations.
Sources:
UNEP Year Book 2008
http://www.unep.org/geo/yearbook/yb2008/
Climate Change Resulting in Shift to 'Green' Economies, Says UN Agency
http://www.un.org/apps/news/story.asp?NewsID=25681&Cr=climate&Cr1=change
Breaking Down the Barriers to a Green Economy
http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=528&ArticleID=5748&l=en

Twenty Years of Environmental Security

Military Implications:
The report is a comprehensive overview of 20 years of change and policies impacting global security, with useful insights for future security needs. It should be read by all who are tasked to plan future policy and actions.
Source:

An Uncommon Peace: Environment, Development, and the Global Security Agenda, by Geoffrey D. Dabelko
http://www.heldref.org/env-dabelko.php

Recommendations for Addressing U.S. Environmental Security

Military Implications:
Relevant military personnel should review and consider the essay and the report as inputs for improving institutional and policy structures to better address climate change-related security issues.
Sources:
Insecure About Climate Change
http://www.washingtonpost.com/wp-dyn/content/article/2008/03/21/AR2008032102631.html?hpid=opinionsbox1
Climate Change and National Security. An Agenda for Action
http://www.cfr.org/publication/14862

Arctic Debate

Arctic Debate Update

Military Implications:
[Similar to previous on the same issue] Negotiations for clear international regulations concerning the Arctic region should be accelerated, to counter any possible escalation of unfriendly attitudes. In any instance, the likelihood of potential new military roles in the region increases, for both national security and protection of the ecosystems. Relevant military personnel should cooperate with their counterparts in other countries and international organizations in developing timely, adequate national and international regulations and enforcement procedures.
Sources:
Russia prepares for future combat in the Arctic
http://en.rian.ru/russia/20080624/111915879.html
Russian general fires Arctic warning
http://www.canada.com/topics/news/story.html?id=ac0d24df-dc10-43da-89f3-b3c3c0928ae7&k=51152
Northern Edge 2008 (NE08) Exercise Underway
http://www.elmendorf.af.mil/news/story.asp?id=123098685&page=2

Arctic Disputes Continue

Military Implications:
[Similar to previous on the same issue] It is likely that discussions for clear international regulations concerning the Arctic region will increase rapidly, opening the potential for new military roles in that region to ensure the safety of individuals and ecosystems. Relevant military personnel should cooperate with their counterparts in other countries and international organizations in developing timely, adequate national and international regulations and enforcement procedures.
Sources:

Climate Change and International Security. Paper from the High Representative and the European Commission to the European Council
http://www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/reports/99387.pdf
U.S. firm lays claim to 'potentially vast' Arctic oil resources
http://www.canada.com/ottawacitizen/news/story.html?id=2699b272-8fed-4da6-8c2a-d54390f7d54b
Arctic Melt Yields Hints of Bigger U.S. Seabed Claim
http://dotearth.blogs.nytimes.com/2008/02/12/arctic-melt-yields-hints-of-bigger-us-seabed-claim/
Continental Slope Off Alaska 100 Nautical Miles Further Off Coast Than Assumed
http://www.sciencedaily.com/releases/2008/02/080211134449.htm

Arctic Issues Still at the Debate Stage

Military Implications:
[Similar to previous on the same issue] It is likely that discussions for clear international regulations concerning the Arctic region will increase rapidly, opening the potential for new military roles in that region to ensure the safety of individuals and ecosystems. Relevant military personnel should cooperate with their counterparts in other countries and international organizations in developing timely, adequate national and international regulations and enforcement procedures.
Sources:
The Ilulissat Declaration. Arctic Ocean Conference Ilulissat, Greenland, 27 – 29 May 2008
http://www.um.dk/NR/rdonlyres/BE00B850-D278-4489-A6BE-6AE230415546/0/ArcticOceanConference.pdf
Time for China and Saudi Arabia to start caring about the Arctic
http://www.newscientist.com/blog/environment/2008/05/time-for-china-and-saudi-arabia-to-muck.html?DCMP=ILC-hmts&nsref=specrt12_bar
Arctic declaration denounced as territorial 'carve up'
http://www.guardian.co.uk/environment/2008/may/29/fossilfuels.poles
Arctic states meet in Greenland. By Jan M. Olsen, The Associated Press
http://cnews.canoe.ca/CNEWS/World/2008/05/28/5693696-ap.html
Norwegian min says conf in Greenland will not carve up Arctic Ocean
http://itar-tass.com/eng/level2.html?NewsID=12721839&PageNum=0
Last-ditch bid to avert Arctic free-for-all
http://www.independent.co.uk/environment/green-living/lastditch-bid-to-avert-arctic-freeforall-835200.html
Reaching out in the Arctic
http://en.rian.ru/analysis/20080514/107378393.html
Russia complying with law in Arctic shelf claim – Ivanov
http://en.rian.ru/russia/20080418/105419030.html

MIGRATION TRIGGERED BY ENVIRONMENTAL CAUSES

Number of People of Concern Rising

Military Implications
[Similar to others on this issue] It is important that the military community participates in the design of an eventual international framework addressing global displacement and migration; continuously reviews the possible causes of refugee flows and preventive measures; and

cooperates with civilian agencies in preparing contingency plans for those circumstances when their assistance is needed.
Sources:
UN warns of growth in climate change refugees
http://www.timesonline.co.uk/tol/news/environment/article4159923.ece?token=null&offset=0
2007 Global Trends: Refugees, Asylum-seekers, Returnees, Internally Displaced and Stateless Persons. June 2008
http://www.unhcr.org/statistics/STATISTICS/4852366f2.pdf

Population Trends and Environmental Impact

Military Implications:
Relevant military personnel should review these reports for population projections that are important for developing adequate early warning and preparedness systems, as well as for developing strategies for preventing eventual conflicts due to scarcities and increasingly probable disasters—mostly in coastal areas.
Sources:
U.S. National Report on Population and the Environment
http://www.cepnet.org/documents/USNatlReptFinal_000.pdf
Press Release http://www.cepnet.org/documents/USNatlReptPressReleaseFINAL8-30-06.doc
Mapping Future Population Growth
http://www.signonsandiego.com/news/science/20060817-9999-lz1c17popula.html
Where will people live in the year 2025? (PDF) map
http://www.signonsandiego.com/uniontrib/20060817/images/world.pdf

Kyrgyzstan's Deforestation Threatens Central Asia's Security

Military Implications:
Given the vulnerability of the region, it is important that international efforts intensify to save biodiversity and ecosystems upon which livelihoods depend, in order to minimize the potential of social unrest. The military responsible for activities or stationed in the region should aid this effort by helping their counterparts develop monitoring and compliance mechanisms or taking physical actions, as may be appropriate under bilateral agreements.
Source:
Kyrgyz Greens Warn of Deforestation Risks
http://www.ens-newswire.com/ens/mar2008/2008-03-11-02.asp

NATURAL DISASTERS AND SCIENTIFIC EVIDENCES

Military Implications:
[Similar for all climate change-related issues] Increasingly more compelling evidence and warnings on climate change amplify international discourse and increase the emergence of international policies trying to tackle the causes and develop strategies to mitigate climate change effects. Hence, the military should be doing its part in reducing greenhouse gas emissions and preparing to help mitigate the human-made and natural catastrophes that could ensue.

Sources:

January 2008
Natural disasters taking greater global toll, UN report
http://news.yahoo.com/s/afp/20080118/sc_afp/worlddisastersenvironment
Zambia Declares Flood Disaster, Rains Lash Region
http://www.planetark.com/dailynewsstory.cfm/newsid/46537/story.htm
Mozambique Floods Could be Worst in Memory – UN
http://www.planetark.com/dailynewsstory.cfm/newsid/46470/story.htm
Zimbabwe's Heavy Rains a Disaster for Farming
http://www.ens-newswire.com/ens/jan2008/2008-01-20-03.asp
This drought may never break
http://www.smh.com.au/news/environment/this-drought-may-never-break/2008/01/03/1198949986473.html
Australian climate changing, experts say
http://www.terradaily.com/reports/Australian_climate_changing_experts_say_999.html
Australia floods strand thousands
http://news.bbc.co.uk/2/hi/asia-pacific/7174377.stm

April 2008
Freshening of deep Antarctic waters worries experts
http://www.enn.com/top_stories/article/34921
'No Sun link' to climate change http://news.bbc.co.uk/2/hi/science/nature/7327393.stm
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http://www.giss.nasa.gov/research/news/20080514/
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Greenhouse gases highest for 800,000 years
http://in.reuters.com/article/environmentNews/idINL1440399320080514
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Boreal forests shift north
http://www.sciencenews.org/view/generic/id/32207/title/Boreal_forests_shift_north

Cyclone death toll nears 4,000 in Myanmar, state radio says
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Response to cyclone in Myanmar 'unacceptably slow' – Ban Ki-moon
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Climate link with killer cyclones spurs fierce scientific debate
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Tornado season deadliest in a decade
http://www.usatoday.com/weather/storms/tornadoes/2008-05-12-tornado_N.htm?csp=DailyBriefing

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Weather Extremes Mark Spring 2008
http://www.thedailygreen.com/environmental-news/latest/weather-extremes-47061601
A dry autumn over much of Australia
http://www.bom.gov.au/climate/drought/drought.shtml
Suffer the Environment at Your Cost!
http://www.kanglaonline.com/index.php?template=kshow&kid=1223

MELTING SEA ICE AND GLACCIERS

Military Implications:
[Similar for all climate change-related issues] Increasingly more compelling evidence and warnings on climate change amplify international discourse and increase the emergence of international policies trying to tackle the causes and develop strategies to mitigate climate change effects. Hence, the military should be doing its part in reducing greenhouse gas emissions and preparing to help mitigate the human-made and natural catastrophes that could ensue.

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UN Climate Chief to Visit Antarctica
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http://www.asahi.com/english/Herald-asahi/TKY200802140059.html
Ice cores show faster global warming
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Antarctic glaciers surge to ocean
http://news.bbc.co.uk/2/hi/science/nature/7261171.stm

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http://nsidc.org/news/press/20080325_Wilkins.html
Antarctic ice shelf 'hangs by a thread'
http://www.antarctica.ac.uk/press/press_releases/press_release.php?id=376
Earth from Space: Further break-up of Antarctic ice shelf
http://www.esa.int/esaEO/SEMMX4R03EF_index_0.html
Meltdown in the Mountains. Record Glacier Thinning Means No Time to Waste on Agreeing New International Climate Regime
http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=530&ArticleID=5760&l=en
Glaciers suffer record shrinkage
http://news.bbc.co.uk/2/hi/in_depth/7299561.stm

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Melting ice caps may trigger more volcanic eruptions
http://environment.newscientist.com/article/dn13583-melting-ice-caps-may-trigger-more-volcanic-eruptions.html (by subscription only; full text in this Appendix)
Cracks in Arctic ice shelves even worse than feared: scientist
http://www.cbc.ca/canada/north/story/2008/04/16/arctic-ice.html
Arctic ice melting fast in summer sun
http://www.thestar.com/sciencetech/article/416901
Arctic Ice More Vulnerable to Sunny Weather, New Study Shows
http://www.ucar.edu/news/releases/2008/arcticice.jsp
Climate change hitting Arctic faster, harder - Polar bears may be at even greater risk
http://www.wwf.ca/NewsAndFacts/NewsRoom/default.asp?section=archive&page=display&ID=1586&lang=EN
Arctic is thawing faster than expected, report says
http://www.theglobeandmail.com/servlet/story/LAC.20080425.CLIMATE25//TPStory/Environment
A Storehouse of Greenhouse Gases Is Opening in Siberia
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'Flammable ice' could be mined for fuel
http://environment.newscientist.com/channel/earth/energy-fuels/mg19826523.400-methane-could-be-mined-from-beneath-permafrost.html
Japan's Arctic methane hydrate haul raises environment fears
http://www.timesonline.co.uk/tol/news/environment/article3740036.ece

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CU-Boulder Researchers Predict 59 Percent Chance Of Record Low Arctic Sea Ice In 2008
http://www.colorado.edu/news/r/1fb96a0f5e60677e20ddafee67219e8d.html

Arctic on thin ice this fall
http://www.rockymountainnews.com/news/2008/apr/30/arctic-thin-ice-fall/

Climate at Both Earth's Poles Shows Clear Human Influence
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http://news.bbc.co.uk/2/hi/science/nature/7417123.stm

June 2008

Bangladesh set to disappear under the waves by the end of the century
http://www.belfasttelegraph.co.uk/news/environment/article3819427.ece

Rising sea levels threaten cities
http://canberra.yourguide.com.au/news/local/news/general/rising-sea-levels-threaten-cities/785840.aspx

Top of sea warming 50% faster than thought
http://www.telegraph.co.uk/earth/main.jhtml?xml=/earth/2008/06/18/scisea118.xml

"Too late" to save Pacific island nation from submersion
http://www.nature.com/news/2008/080606/full/news.2008.880.html

Residents in danger of flooding from global warming should be forcibly relocated: gov't report
http://mdn.mainichi.jp/national/news/20080618p2a00m0na025000c.html

Rising Sea Levels

Military Implications:

[Similar for all climate change-related issues] Increasingly more compelling evidence and warnings on climate change amplify international discourse and increase the emergence of international policies trying to tackle the causes and develop strategies to mitigate climate change effects. Hence, the military should be doing its part in reducing greenhouse gas emissions and preparing to help mitigate the human-made and natural catastrophes that could ensue.

Sources:

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Global warming continues to erode Arctic coast. RIA Novosti, January 25, 2008
http://en.rian.ru/analysis/20080125/97753436.html

Rising Seas Threaten China's Sinking Coastal Cities
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Tuvalu struggles to hold back tide
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Spanish study warns of rising Mediterranean sea levels
http://www.terradaily.com/reports/Spanish_study_warns_of_rising_Mediterranean_sea_levels_999.html

Warning on rising Med Sea levels
http://news.bbc.co.uk/1/hi/sci/tech/7197379.stm

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Rising sea levels could swallow California's delta islands
http://www.helenair.com/articles/2007/06/04/montana/000arise.txt

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Sinking without trace: Australia's climate change victims
http://www.independent.co.uk/environment/climate-change/sinking-without-trace-australias-climate-change-victims-821136.html
French-US satellite set for June launch to track sea levels
http://afp.google.com/article/ALeqM5gv2lwkG8qxbEaQ-wL1FaeDj0RIxA

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http://www.belfasttelegraph.co.uk/news/environment/article3819427.ece
Rising sea levels threaten cities
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Top of sea warming 50% faster than thought
http://www.telegraph.co.uk/earth/main.jhtml?xml=/earth/2008/06/18/scisea118.xml
"Too late" to save Pacific island nation from submersion
http://www.nature.com/news/2008/080606/full/news.2008.880.html
Residents in danger of flooding from global warming should be forcibly relocated: gov't report
http://mdn.mainichi.jp/national/news/20080618p2a00m0na025000c.html

Polar Bear, the First Species declared Endangered Due to Global Warming

Military Implications:
Declaring the polar bear as a threatened species creates a precedent for new actions to address consequences of climate change. It is fair to speculate that other countries will follow suit by declaring other animals and their habitats protected. The military should determine if the new status of the polar bears affects military activities in pertinent regions.
Sources:
Polar bear is listed as threatened species
http://www.latimes.com/news/nationworld/nation/la-me-polar15-2008may15,0,3225200.story?page=2
Polar Bear Added to List of Threatened Species in U.S.
http://www.voanews.com/english/Science/2008-05-16-voa27.cfm
U.S. lists polar bears as threatened species
http://www.cbc.ca/world/story/2008/05/14/polar-bear.html

FOOD AND FRESHWATER

Food Crisis

Military Implications:
Global, regional, and selected national scenarios on rising food prices and resulting social conflicts should be created to help understand security priorities and points of intervention. The scenario teams should draw on the expertise of FAO, the World Food Program, UNHCR (UN High Commissioner for Refugees), USAID, and others with direct field data experience.

Sources:

February 2008
Feed the world? We are fighting a losing battle, UN admits
http://www.guardian.co.uk/environment/2008/feb/26/food.unitednations
The World's Growing Food-Price Crisis
http://www.time.com/time/world/article/0,8599,1717572,00.html
Prioritizing Climate Change Adaptation Needs for Food Security in 2030. *Science*, 1 Feb. 2008
http://www.sciencemag.org/cgi/content/abstract/319/5863/607 (abstract)
Climate 'could devastate crops'
http://news.bbc.co.uk/2/hi/science/nature/7220807.stm
Food's Failed Estates = Paris's Hot Cuisine; Food Sovereignty – à la Cartel?
http://www.etcgroup.org/en/materials/publications.html?pub_id=673
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http://www.sciencemag.org/cgi/content/abstract/1152538
Water troubles in the West may worsen
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Lakes Mead and Powell could run dry by 2021
http://www.csmonitor.com/2008/0213/p25s05-usgn.html
'SA's water could run out by 2025'
http://www.int.iol.co.za/index.php?set_id=1&click_id=14&art_id=vn20080214113314841C685433

March 2008
Tensions Rise As World Faces Short Rations
http://www.planetark.com/dailynewsstory.cfm/newsid/47716/story.htm
EU warns of climate change threat
http://news.bbc.co.uk/2/hi/europe/7287168.stm
Africa: AU Marks Environment Day
http://allafrica.com/stories/200803041273.html

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Global Hot Spots of Hunger Set to Explode
http://ipsnews.net/news.asp?idnews=41976
International Assessment of Agricultural Knowledge, Science and Technology for Development
http://www.agassessment.org/index.cfm?Page=IAASTD%20Reports&ItemID=2713

Modern agricultural practices must change, concludes report to be presented at UNESCO
http://portal.unesco.org/en/ev.php-URL_ID=42192&URL_DO=DO_TOPIC&URL_SECTION=201.html
U.N. Panel Urges Changes to Feed Poor While Saving Environment
http://www.nytimes.com/2008/04/16/world/europe/16food.html?_r=1&ref=world&oref=slogin
International Federation launches new five-year food security strategy in Africa focussing on long-term investments
http://www.ifrc.org/Docs/News/pr08/1508.asp
Region urged to make the environment a priority
http://www.caribbeannetnews.com/news-7280--39-39--.html
A Drought in Australia, a Global Shortage of Rice
http://www.nytimes.com/2008/04/17/business/worldbusiness/17warm.html?_r=1&oref=slogin
Water scarcity concerns growing
http://www.planet2025news.net/ntext.rxml?id=9837&photo=
Food, land crisis linked to environmental degradation, UNCCD says
http://africasciencenews.org/asns/index.php?option=com_content&task=view&id=314&Itemid=1
Melting mountains a "time bomb" for water shortages
http://africa.reuters.com/wire/news/usnL14573335.html
Town in the Andes faces crisis as glaciers melt
http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2008/04/23/MNSDVIN7E.DTL

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Food Crisis Escapes Security Council Scrutiny
http://www.asiantribune.com/?q=node/10984

United Nations Sustainable Development Commission Set To Tackle Issues Underpinning Global Food Crisis, At Headquarters, 5-16 May
http://www.un.org/News/Press/docs//2008/envdev974.doc.htm

Secretary-General convenes inaugural meeting of food crisis task force
http://www.un.org/apps/news/story.asp?NewsID=26632&Cr=food&Cr1=crisis

Task Force on global food crisis to move at ‘full speed’ – Ban Ki-moon
http://www.un.org/apps/news/story.asp?NewsID=26562&Cr=food&Cr1=crisis

High-Level Conference on World Food Security: the Challenges of Climate Change and Bioenergy – Rome, FAO, 3-5 June
http://www.fao.org/newsroom/

Firms Seek Patents on 'Climate Ready' Altered Crops
http://www.washingtonpost.com/wp-dyn/content/article/2008/05/12/AR2008051202919.html

Patenting the “Climate Genes”…And Capturing the Climate Agenda
http://www.etcgroup.org/upload/publication/pdf_file/687

Gene Giants Grab "Climate Genes"
http://www.etcgroup.org/en/materials/publications.html?pub_id=688

India's Rice Farmers Abandon Paddies, Deepening Global Shortage
http://www.bloomberg.com/apps/news?pid=20601091&sid=aKifVN0bmi9E&refer=india

Global Warming Linked to Rainfall Decline in South-East Australia
http://www.mdbc.gov.au/subs/seaci/SEACImedia-release-May08.pdf

Murray-Darling woes linked to global warming: report
http://www.abc.net.au/news/stories/2008/05/02/2233524.htm

Experts warn of never-ending drought
http://www.theage.com.au/news/national/drought-may-never-end/2008/05/09/1210131244721.html
Civil Society statement on the World Food Emergency. No More "Failures-as-Usual"!
http://www.nyeleni.eu/foodemergency/CSOdraftStatement-English.pdf

Actions for addressing Food Crises

Military Implications:
Relevant military personnel should review short- and long-term military resources that could respond to the world food problem and reduce food crises, famine, riots, and risks of conflicts, and should make recommendations to those preparing for the G-8, and FAO meetings in October and November. These recommendations could also be included in parallel discussions in security forums and aid-related forums with such organizations as USAID, WFP, UNHCR, and NGO forums like InterAction.
Sources:

April 2008
U.N. Panel Urges Changes to Feed Poor While Saving Environment
http://www.nytimes.com/2008/04/16/world/europe/16food.html?_r=1&ref=world&oref=slogin
International Federation launches new five-year food security strategy in Africa focussing on long-term investments
http://www.ifrc.org/Docs/News/pr08/1508.asp
Region urged to make the environment a priority
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http://www.un.org/News/Press/docs//2008/envdev974.doc.htm
Secretary-General convenes inaugural meeting of food crisis task force
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Task Force on global food crisis to move at 'full speed' – Ban Ki-moon
http://www.un.org/apps/news/story.asp?NewsID=26562&Cr=food&Cr1=crisis
High-Level Conference on World Food Security: the Challenges of Climate Change and Bioenergy – Rome, FAO, 3-5 June
http://www.fao.org/newsroom/
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http://www.nyeleni.eu/foodemergency/CSOdraftStatement-English.pdf

June 2008
FAO June Food Summit
http://www.fao.org/newsroom/en/focus/2008/1000829/index.html
"Failure as Usual" Food Summit
http://www.etcgroup.org/en/materials/publications.html?pub_id=698

Tunisia pleads for creation of CEN-SAD food security observatory
http://www.apanews.net/apa.php?page=show_article_eng&id_article=66771
Nobel luareate *[sic]* urges AU summit to prioritize the environment
http://www.apanews.net/apa.php?page=show_article_eng&id_article=67897

Food Crises and Biotechnology

Military Implications:
[Similar on others on food crisis issues] Global, regional, and selected national scenarios on social conflicts should be created to help understand security priorities and points of intervention. The scenario teams should draw on the expertise of FAO, the World Food Program, UNHCR (UN High Commissioner for Refugees), USAID, and others with direct field data experience.
Sources:
Firms Seek Patents on 'Climate Ready' Altered Crops
http://www.washingtonpost.com/wp-dyn/content/article/2008/05/12/AR2008051202919.html
Patenting the "Climate Genes"…And Capturing the Climate Agenda
http://www.etcgroup.org/upload/publication/pdf_file/687
Gene Giants Grab "Climate Genes"
http://www.etcgroup.org/en/materials/publications.html?pub_id=688
India's Rice Farmers Abandon Paddies, Deepening Global Shortage
http://www.bloomberg.com/apps/news?pid=20601091&sid=aKifVN0bmi9E&refer=india

Water Scarcity

Military Implications:
The military should intensify efforts to improve and accelerate dialogue and cooperation for an international water management system and the design of an international adaptation and mitigation strategy addressing increased water scarcity and its effects.
Sources:

April 2008
A Drought in Australia, a Global Shortage of Rice
http://www.nytimes.com/2008/04/17/business/worldbusiness/17warm.html?_r=1&oref=slogin
Water scarcity concerns growing
http://www.planet2025news.net/ntext.rxml?id=9837&photo=
Melting mountains a "time bomb" for water shortages
http://africa.reuters.com/wire/news/usnL14573335.html
Town in the Andes faces crisis as glaciers melt
http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2008/04/23/MNSDVIN7E.DTL

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Experts warn of never-ending drought
http://www.theage.com.au/news/national/drought-may-never-end/2008/05/09/1210131244721.html

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Nature laid waste: The destruction of Africa
http://www.independent.co.uk/news/world/africa/nature-laid-waste-the-destruction-of-africa-844370.html
Water crisis to be biggest world risk
http://www.telegraph.co.uk/money/main.jhtml?xml=/money/2008/06/05/ccwater105.xml

Acctions for Addressing Water Security

Military Implications:
Liaison should be sought with the new inititives for mutual benefit to improve water security in those regions.
Sources:

May 2008
A Review of Decision-Making Support Tools in the Water, Sanitation, and Hygiene Sector
http://www.pacinst.org/reports/WASH_tool/index.htm
Bigger and Better Stormwater BMP Database
http://www.enn.com/press_releases/2480
WERF website http://www.werf.org//AM/Template.cfm?Section=Home

June 2008
Singapore's PM says water security may spark conflicts
http://www.reuters.com/article/environmentNews/idUSSIN27852320080624

Climate Change and Access to Water Addressed as Human Rights

Military Implications:
Military personnel should be asked to consider the following questions: If water were to become a human right in some countries, how might their militaries be called upon to insure that right? How might that affect military-to-military assistance? What new opportunities might that present to further international environmental security?
Sources:
U.N. human rights body turns to climate change
http://www.reuters.com/article/environmentNews/idUSL2778449820080328?feedType=RSS&feedName=environmentNews&sp=true
Human Rights Council Adopts 36 Resolutions and Extends Mandates of 13 Special Procedures at Seventh Regular Session
http://www.unhchr.ch/huricane/huricane.nsf/view01/AADEFF2389520CC0C125741A0071BB93?opendocument

PREVENTION AND ADAPTATION

Military Implications:

The military should increasingly include in its training and planning strategies actions related to preparation, adaptation, and mitigation of climate change effects to reduce security-related challenges. Scenarios at local, national, regional, and global level should be considered to identify the horspots and focus efforts and strategies accordingly.

Sources:

Adaptation Needs and Actions

Janaury 2008
Under dry sky, Aussies turn to the sea
http://marketplace.publicradio.org/display/web/2008/01/27/planb_mmr1_desalination
Maldives Builds Barriers to Global Warming
http://www.npr.org/templates/story/story.php?storyId=18425626

March 2008
Latest round of UN climate talks to start next week
http://www.un.org/apps/news/story.asp?NewsID=26140&Cr=climate&Cr1=
Caribbean plans tsunami warning system by 2010
http://www.alertnet.org/thenews/newsdesk/N13326240.htm
Caribbean Tsunami Warning System to Take Step Forward With Un-Backed Group
http://www.un.org/apps/news/story.asp?NewsID=25948&Cr=tsunami&Cr1=

Regional Strategies

Indigenous Peoples Demand More Involvement in Environmental Policies

Military Implications:
The military, in cooperation with aid and environmental organizations, should work with indigenous peoples to develop sustainable mitigation and adaptation strategies, especially in communities prone to natural disasters and climate change effects. Indigenous people may request new regulations for more restricted and protected areas and/or restraint of specific environmentally damaging actions. Since ingenious people see their cultures increasingly threatened, the military, working with governments, should assess the “hot spots” and try to mitigate potential social unrest.
Sources:
Seventh Session of the United Nations Permanent Forum on Indigenous Issues
http://www.un.org/esa/socdev/unpfii/en/session_seventh.html
Climate Change: Indians Speak Out Against Carbon Markets
http://www.ipsnews.net/news.asp?idnews=42259
Climate change plea from tribe of herders who face extinction
http://www.independent.co.uk/environment/climate-change-plea-from-tribe-of-herders-who-face-extinction-825424.html
World's Native Peoples Take on Climate Change
http://www.loe.org/shows/segments.htm?programID=08-P13-00019&segmentID=4

Indigenous peoples have crucial role in climate change debate – UN forum
http://www.un.org/apps/news/story.asp?NewsID=26565&Cr=indigenous&Cr1=
Indigenous peoples most affected by climate change, Assembly President says
http://www.un.org/apps/news/story.asp?NewsID=26531&Cr=indigenous&Cr1=

HEALTH

Global Health Security Threats

Environment and Human Health Integration

Military Implications
Relevant military personnel should review and consider the reports for possible additional inputs of an interdisciplinary approach to reduce security threats and improve force protection.
Sources:
Integrating Environment and Human Health
http://www.ncseonline.org/2007conference/NCSE%2007%20Conf%20Report%20FINAL.pdf
Climate, Poverty and Health: Time for Preventive Medicine
http://www.ncseonline.org/2007conference/07ChafeeReportFINAL.pdf
Environment and Health conference website
http://www.ncseonline.org/2007conference

Actions to Address Health Threats

Antigenic Maps Help Trace Development of Diseases

Military Implications:
The military should investigate this technique to evaluate its usefulness in assessing the environment in a biological warfare situation.
Source:
Maps Point the Way to Fighting the Flu Virus
http://www.sciam.com/article.cfm?id=antigenic-cartography-maps

A Community Guide to Environmental Health Available for Liaison Activities

Military Implications:
Military personnel working with communities on environmental problems should be aware of this publication, and be prepared to share it with their opposite numbers on the community side, as a means of helping them deal with their concerns.
Source:
"A Community Guide to Environmental Health," an Essential Tool Kit for Global Communities Tackling Environmental Problems To Be Released by Hesperian June 18, 2008
http://www.enn.com/press_releases/2529

COMPUTER MODELING

Military Implications:
[Similar for all climate change-related issues] Increasingly more compelling evidence and warnings on climate change amplify international discourse and increase the emergence of international policies trying to tackle the causes and develop strategies to mitigate climate change effects. Hence, the military should be doing its part in reducing greenhouse gas emissions and preparing to help mitigate the human-made and natural catastrophes that could ensue.
Sources:

February 2008
UN-backed meeting urges governments, scientists to bolster climate predictions
http://www.un.org/apps/news/story.asp?NewsID=25528&Cr=climate&Cr1=change
WMO plans conference on improving climate predictions
http://www.terradaily.com/reports/WMO_plans_conference_on_improving_climate_predictions_999.html
Atmospheric stabilization and the timing of carbon mitigation. *Climatic Change*, Feb 13, 2008
http://www.springerlink.com/content/y30j24p29m112g64/ (abstract)
No time to lose in cutting CO2 emissions. *New Scientist*, 27 February 2008
http://environment.newscientist.com/channel/earth/climate-change/mg19726454.500-no-time-to-lose-in-cutting-cosub2sub-emissions.html (by subscription)

April 2008
New MIT study validates hurricane prediction
http://web.mit.edu/newsoffice/2008/emanuel-paper-0417.html
Climate Change Likely To Intensifies Storms, New Study Confirms
http://www.sciencedaily.com/releases/2008/04/080417170213.htm
MIT study confirms that climate change creates stronger storms
http://www.planet2025news.net/ntext.rxml?id=9769&photo=
Revisiting the global warming-hurricane link
http://www.csmonitor.com/2008/0414/p02s04-wogi.html

May 2008
Poor forecasting undermines climate debate
http://environment.newscientist.com/channel/earth/mg19826543.700-poor-forecasting-undermines-climate-debate.html (by subscription only; full text below)
They say they want a revolution
http://www.nature.com/news/2008/080514/full/453268a.html
World Modelling Summit for Climate Prediction, 6 to 9 May 2008
http://www.ecmwf.int/newsevents/meetings/workshops/2008/ModellingSummit/presentations/index.html

C. Protecting the Environment Due to Its Inherent Moral Value

ENVIRONMENTAL SECURITY-RELATED INTERNATIONAL REGULATIONS THAT HAVE BEEN COMING INTO FORCE SINCE JULY 2007

Waste Export Regulations Revised and Tightened

Military Implications:
[Same as previous on related issues] The regulation on transboundary shipments of waste doesn't seem to have exceptions for the military; hence, relevant military personnel should comply with the new regulation, as appropriate under Status of Forces Agreements.
Sources:
Trade and environment. Shipment of non-hazardous waste to certain non-OECD countries: Green list waste
http://ec.europa.eu/trade/issues/global/environment/waste.htm
Regulation (EC) No 1418/2007
http://trade.ec.europa.eu/doclib/html/136966.htm
Waste exports: better protection for developing countries
http://www.defra.gov.uk/news/2008/080111a.htm
Improved protection on waste exports for developing countries
http://www.morethanwaste.com/Site/Default.aspx/7B662DEFBE639810F0F4

Shipwrecks Removal Treaty Received First Signature

Military Implications:
The military/Navy should explore military-to-military opportunities for international cooperation on such ship removals.
Sources:
Estonia the first to sign UN-backed sea wreck treaty
http://www.un.org/apps/news/story.asp?NewsID=26130&Cr=maritime&Cr1=
New international treaty on wreck removal adopted in Nairobi
http://www.imo.org/About/mainframe.asp?topic_id=1472&doc_id=8070

Environmental Damage to Be Criminalized in the EU

Military Implications:
The Directive does not contain an exception clause for the military. Military organizations stationed in the EU countries should assess the impact of the Directive on their operations and in relation to existing Status of Forces Agreements (SOFAs) and other agreements, and as to whether or how it would affect its service members', contractors' and dependents' activities.
Sources:
Protection of the environment through criminal law
http://www.consilium.europa.eu/uedocs/cms_Data/docs/pressdata/en/misc/100525.pdf
EU criminal law to protect the environment
http://www.europarl.europa.eu/news/expert/infopress_page/064-29450-140-05-21-911-20080520IPR29449-19-05-2008-2008-false/default_en.htm

EU agrees to outlaw 'green' crimes
http://www.wbcsd.org/plugins/DocSearch/details.asp?type=DocDet&ObjectId=MzAxNTU

EU Airline Carbon Trading to Start in 2011—a Year Earlier than Planned
Military Implications:
[Same as previous on similar issues] It is not clear at this point if the proposed EU regulation concerns just commercial and private flights, or all. The military should explore impacts on its European operations and consult with allied military forces on the status of military exemptions.
Sources:
EU backs early start for airline carbon trading
http://www.guardian.co.uk/environment/2008/may/28/travelandtransport.greenpolitics

France Bans 30 Pesticide Components
Military Implications:
The military should review its usage of any materials containing the 53 designated chemicals to ensure that it appropriately complies with this and is prepared for possible similar future bans wherever U.S. Forces are stationed or materiel is sold in nations that follow the French lead in such matters.
Sources:
France scraps licenses for 1,500 pesticides
http://www.enn.com/top_stories/article/30282
French Pesticide Ban Hits Major Listed Firms
http://www.planetark.org/dailynewsstory.cfm/newsid/46752/story.htm

PROPOSED TREATIES AND/OR CHANGES TO EXISTING ONES

Waste Management

Basel Convention Needs Revision and Update
Military Implications:
In the absence of a legal framework, the military should adopt its own guidelines based on the conference's outcomes, and plans for future military-to-military assistance should consider training and logistics support to counter illegal environmental trade.
Sources:
Ninth meeting of the Conference of the Parties to the Basel Convention (COP9)
http://cop9.basel.int/
Delegates fail to agree on banning toxic waste exports at UN conference
http://www.iht.com/articles/ap/2008/06/27/asia/AS-GEN-Indonesia-Toxic-Trade.php
UN conference in Bali tackles toxic-waste management
http://www.cbc.ca/world/story/2008/06/26/toxic.html

EU Vote on Revision of Waste Directive
Military Implications:

[Same as previous on similar issues] The military stationed in the EU should assess the impact of the new directive on their operations and prepare (in accord with Status of Forces Agreements) for eventual necessary changes in order to comply with the new regulations.
Sources:
Commission welcomes EP vote on revision of waste directive
http://europa.eu/rapid/pressReleasesAction.do?reference=IP/08/950&format=HTML&aged=0&language=EN&guiLanguage=en
DG ENV waste policy homepage: http://ec.europa.eu/environment/waste/index.htm

Chemical, Biological, and Nuclear Safey

Stockholm Convention on Persistent Organic Pollutants Is Succeeding in Europe

Military Implications
This study gives good insights for improving the monitoring system of POPs. Although the U.S. did not ratify the Stockholm Convention, it should be prepared to comply with its requirements when acting in countries Party. Thus, in addition to the preparation for phase-out of the POPs banned, it should consider the military implications of those proposed for addition to Convention coverage.
Source:
Evaluating emission protocols for persistent organic pollutants
http://ec.europa.eu/environment/integration/research/newsalert/pdf/95na6.pdf

EU to Add Carbon and Graphite to REACH Program

Military Implications:
Military procurement personnel should ensure that contractors are complying with these new provisions.
Sources:
"European Chemicals Agency: Turning REACH into Reality" Inauguration of the European Chemical Agency, Helsinki, 3 June 2008
http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/08/298&format=HTML&aged=0&language=EN&guiLanguage=en
Nanotech Worries Push EU To Seek Full Safety Data For Carbon
http://www.nasdaq.com/aspxcontent/NewsStory.aspx?cpath=20080609%5CACQDJON20080609702DOWJONESDJONLINE000171.htm&&mypage=newsheadlines&title=Nanotech%20Worries%20Push%20EU%20To%20Seek%20Full%20Safety%20Data%20For%20Carbon

Canada Prepares to Ban More Chemicals

Military Implications:
In anticipation of the possibility of similar action being taken internationally or in other jurisdictions, the military should review the Canadian proposal, and military usage of these materials to see if steps need to be taken to prepare for their replacement.
Source:
Ottawa prepared to slap toxic label on widely used chemicals
http://www.canada.com/topics/news/national/story.html?id=b0eeb176-6b3d-4a3e-bb18-29033eb044cc

Reactive Nitrogen Beginning To Be Recognized As Environmental Hazard

Military Implications:
The military environmental community should ensure that this problem is receiving adequate attention, and should participate in the Initiative.
Source:
Addressing the 'nitrogen cascade'
http://www.physorg.com/news130081079.html

Pollution and Greenhouse Gases

Provisional Agreement for Including Aviation in the Emission Trading Scheme from 2012

EU Lawmakers Confirm Deal on Airline CO2 Emissions
http://www.planetark.com/dailynewsstory.cfm/newsid/49072/story.htm

European Parliament Approves New Water Quality Standards Directive

Military Implications:
The military stationed in the EU should assess the impact of the new directive on their operations and prepare for eventual necessary changes in order to comply with the new regulations.
Sources:
Environment: Commission welcomes EP vote on water quality standards
http://europa.eu/rapid/pressReleasesAction.do?reference=IP/08/958&format=HTML&aged=0&language=EN&guiLanguage=en

Post-Kyoto Protocol Negociations

Moves Forward on the Post-Kyoto Negotiations

Bali Roadmap Sets Framework for Post-Kyoto Negotiations

Military Implications:
The military should review the Bali roadmap for opportunities to apply the Army Strategy on the Environment and to contribute to negotiations on the role of the military on mitigation and adaptation to climate change. As suggested in the September 2007 monthly report, the military should bring together information on all its efforts to reduce climate change and its capacities to anticipate and respond to the effects of climate change (e.g., an executive information system) for continual review and improvement, noting efforts to reduce the military environmental footprint, the environmental dimensions in its operations, its role in developing adaptation and mitigation plans, and the inclusion of environment-related factors in conflict prevention strategies.

Sources:

February 2008
Lawmakers Gather In Brazil To Discuss Climate Change
http://www.planetark.com/dailynewsstory.cfm/newsid/47050/story.htm
Brazil calls on G8 to meet Kyoto Protocol goals
http://www.terradaily.com/2007/080221223113.rumu8gc4.html
Japan Considers Emissions Cap And Trade System
http://www.planetark.com/dailynewsstory.cfm/newsid/47080/story.htm
Secretary-General says environment ministers can offer 'new generation of solutions' in message to Monte Carlo global forum
http://www.un.org/News/Press/docs/2008/sgsm11434.doc.htm

March 2008
Bangkok Climate Change Talks - 31 March to 4 April 2008
http://unfccc.int/meetings/intersessional/awg-lca_1_and_awg-kp_5/items/4288.php
Latest Round of UN Climate Talks to Start Next Week
http://www.un.org/apps/news/story.asp?NewsID=26140&Cr=climate&Cr1=
Global climate talks in Bangkok to set stage for future pact
http://www.terradaily.com/2007/080328025105.qidheipz.html
Growth in China's CO2 Emissions Double Previous Estimates
http://www.ens-newswire.com/ens/mar2008/2008-03-11-01.asp
Climate change action delayed by decade's debate
http://business.smh.com.au/climate-change-action-delayed-by-decades-debate/20080312-1yux.html

April 2008
Nations agree to look at planes, ships in climate deal
http://afp.google.com/article/ALeqM5j_veCL4RvqgD9xgkgi9R1JdBEjBA
UN Climate Talks Agree on Agenda
http://ap.google.com/article/ALeqM5jRlJomFc4kOiCDSizIKDQ6uLFzvwD8VR8IRG0
Tough road lies ahead for global climate deal
http://www.mg.co.za/articlepage.aspx?area=/breaking_news/breaking_news__international_news/&articleid=336321
Summary of The First Session of The Ad Hoc Working Group on Long-Term Cooperative Action and The Fifth Session of The Ad Hoc Working Group on Further Commitments For Annex I Parties Under The Kyoto Protocol
http://www.iisd.ca/vol12/enb12362e.html
Bangkok Climate Change Talks - 31 March to 4 April 2008
http://unfccc.int/meetings/intersessional/awg-lca_1_and_awg-kp_5/items/4288.php
Europe for aviation, shipping cuts
http://howrah.org/World/8720.html

May 2008
From Bali to Poznan: New Issues, New Challenges
http://www.envirosecurity.org/activities/diplomacy/gfsp/climate

National and Regional Initiatives

March 2008
Growth in China's CO2 Emissions Double Previous Estimates
http://www.ens-newswire.com/ens/mar2008/2008-03-11-01.asp
Climate change action delayed by decade's debate
http://business.smh.com.au/climate-change-action-delayed-by-decades-debate/20080312-1yux.html

April 2008

Australia 2020 http://www.australia2020.gov.au/
Australia 2020 Summit a powerful symbol: editorial
http://www.news.com.au/couriermail/story/0,23739,23575926-13360,00.html
Governors Call for Federal-State Climate Change Partnership
http://www.ens-newswire.com/ens/apr2008/2008-04-18-01.asp
Do global warming pledges matter?
http://www.terradaily.com/2007/080403023938.mw16xxva.html

May 2008
G8 Environment Ministers Agree on 2050 Climate Goal
http://www.ens-newswire.com/ens/may2008/2008-05-27-04.asp

Energy Saving

Vanishing Supply of World's Helium Calls for Conservation

Military Implications:
The military should conserve the supply of helium and seek substitutes and less expensive methods for its production. Recovery and recycling programs should also be considered by the military and civilian contractors.
Source:
Helium Supplies Endangered, Threatening Science and Technology
http://www.enn.com/top_stories/article/28495

Biological Diversity

New Mechanisms for Enforcing Biosafety and Biological Diversity Treaties

Military Implications:
[Same as previous on similar issues] The military should note the outcomes of the two meetings and be prepared to comply with the new requirements, including genetically modified organism (GMO) labeling of food containers it brings into Protocol member countries and new measures for protecting biodiversity.

Sources:
Fourth meeting of the Parties to the Cartagena Protocol on Biosafety (COP-MOP 4)
http://www.cbd.int/mop4/
Agreement Reached to Work towards a Legally Binding Instrument on Liability and Redress with Regard to GMOs
http://www.cbd.int/doc/press/2008/pr-2008-05-16-mop4-en.pdf
Rules, Procedures and Mechanisms Applicable to Processes under the Cartagena Protocol on Biosafety
http://www.cbd.int/doc/publications/bs-rules-en.pdf
Loss of Animal Species and Crops Is 'Devastating' - Secretary-General Ban
http://www.un.org/apps/news/story.asp?NewsID=26756&Cr=biodiversity&Cr1=
Ninth Meeting of the Conference of the Parties to the Convention on Biological Diversity
http://www.iisd.ca/biodiv/cop9

Deforestation Not Yet Adequately Addressed by International Regulations

Military Implications:
In addition to considering forest protection in its planning, military deployed in areas vulnerable to undesirable deforestation should work with the local communities to find strategies to avoid unsustainable practices and help capacity-building to increase sustainable development.
Sources:
Forests play key role against climate change, UN tells African-Near East meeting
http://www.un.org/apps/news/story.asp?NewsID=25665&Cr=climate&Cr1
UN: Mangrove Forests Vanishing at an "Alarming" Rate
http://www.ens-newswire.com/ens/feb2008/2008-02-03-01.asp
With Africa leading, UN says world fells trees at 'alarming' rate
http://canadianpress.google.com/article/ALeqM5gggsgsXc-FLgGsLpo3A2ZwqOAdvw

Marine Environment

IMO Sets New Limits on Ship Fuel Pollution

Military Implications:
The military must take these tightening requirements on maritime fuel composition into account in planning future fuel and vessel acquisitions.
Source:
Short sea shipping at risk from IMO sulphur laws
http://lloydslist.com/ll/news/short-sea-shipping-at-risk-from-imo-sulphur-laws/20017521753.htm
IMO environment meeting to consider revised regulations on ship emissions
http://www.imo.org/
U.N. body to slash ship fuel pollution by 2015
http://www.reuters.com/article/environmentNews/idUSL0487267520080404

Marine Protection to Increase

Military Implications:
The Navy and the military involved in marine operations should monitor the course of new regulations to ensure compliance, as well as to reduce their activities' possible negative effect on the marine ecosystem.
Sources:
2008 Scientific Committee report
http://www.iwcoffice.org/sci_com/screport.htm
Oxygen-starved oceans rapidly dying
http://canberra.yourguide.com.au/news/local/news/general/oxygenstarved-oceans-rapidly-dying/796215.aspx
Ministry of the Environment, New Zealand's ocean: http://www.mfe.govt.nz/issues/oceans/
Legislation to safeguard ocean ecosystems
http://www.scoop.co.nz/stories/PA0806/S00460.htm

Concerns over Maritime Air Pollution Increase

Military Implications:
Although emissions from military ships make up only a tiny fraction of this polluting source, the Navy should be prepared for new international anti-pollution regulations that may not exempt military craft.
Sources:
BLG Sub-Committee agrees technical proposals for reduction of air pollution from ships
http://www.imo.org/Newsroom/mainframe.asp?topic_id=1709&doc_id=9015
Ship CO2 emissions at 3.5 pct of global total: IMO
http://www.planet2025news.net/ntext.rxml?id=6196&photo=
Pollution from ships big worry
http://www.charleston.net/news/2008/feb/23/pollution_from_ships_big_worry31612/
True scale of $C0_2$ emissions from shipping revealed
http://www.guardian.co.uk/environment/2008/feb/13/climatechange.pollution
Shipping boom fuels rising tide of global CO2 emissions
http://www.guardian.co.uk/environment/2008/feb/13/climatechange.pollution1?gusrc=rss&feed=uknews
Emissions concerns rise over ships' fuel
http://www.gloucestertimes.com/punews/local_story_031233139.html?keyword=topstory

Whale Conservation Protected Efforts Increasing

Military Implications:
Military operating in marine regions designated as conservation areas should increase vigilance and be prepared for new restrictions on activities that might threaten marine endangered species.
Sources:
Puget Sound Orca Recovery Plan Released
http://www.physorg.com/news120453628.html
Salty shepherds. The Economist, Jan 24th 2008
http://www.economist.com/world/asia/displaystory.cfm?story_id=10566770
New Zealand PM Warns Off Japanese Whalers
http://www.planetark.com/dailynewsstory.cfm/newsid/46633/story.htm

A Change in Climate for Whales. Second Pew-Sponsored Whale Symposium
http://www.pewwhales.org/tokyosymposium/
Intersessional Meeting on the future of the IWC, London, 2008
http://www.iwcoffice.org/meetings/intersession.htm

New Pacific Marine Protected Area Is World's Largest

Military Implications:
Naval authorities in the region should ensure that their operations conform to the restrictions imposed on this new Marine Protected Area.
Source:
Kiribati creates world's largest marine reserve
http://uk.reuters.com/article/idUKSP23110320080214?pageNumber=3&virtualBrandChannel=0&sp=true

Plastic Threats to the Marine Environment

Military Implications:
Increased awareness and compelling evidence of the impact of plastics on the environment in general, and the marine one specifically, might trigger updates to such regulations as the Convention on the Prevention of Marine Pollution or even new rules specifically regulating plastics. The military should ensure that its procedures comply with the best practices, and reduce, as much as possible, dumping of polluting material (such as plastic) in marine or other non-appropriate environments to avoid criticism and eventual penalties. It should also increase efforts to use biodegradable materials whenever possible and replace the non-degradable ones.
Source:
Warning on plastic's toxic threat
http://news.bbc.co.uk/2/hi/science/nature/7316441.stm

Weapons-related

European Parliament Passed Resolution Calling for Global Ban of DU Weapons

Military Implications:
The military should continue pursuing R&D for substitutes and be prepared for increased political pressure for current and past battlefield cleanup.
Sources:
European Parliament passes far reaching DU resolution in landslide vote
http://www.bandepleteduranium.org/en/a/181.html
Protection of the environment through criminal law
http://www.consilium.europa.eu/uedocs/cms_Data/docs/pressdata/en/misc/100525.pdf

International Convention on Cluster Munitions Adopted by 111 Countries

Military Implications:
Although the U.S. does not support the Cluster Munitions Convention, it would be wise for the military to make plans for the elimination of cluster bombs, as international opinion continues to grow against these weapons, possibly resulting in changed policy during the next administration.

Sources:
Dublin Diplomatic Conference, May 19-30, 2008
http://www.clustermunitionsdublin.ie/
Cluster Munitions: Convention a major step forward for the protection of civilians
http://www.icrc.org/Web/Eng/siteeng0.nsf/html/cluster-munitions-news-290508
Cluster Bomb Treaty Breaks New Ground
http://hrw.org/english/docs/2008/05/30/18976.htm
Cluster bomb ban treaty approved
http://news.bbc.co.uk/2/hi/europe/7423714.stm
Convention banning cluster bombs adopted
http://www.khaleejtimes.com/DisplayArticle.asp?xfile=data/theworld/2008/May/theworld_May1353.xml&section=theworld
Norway: British support crucial to cluster bomb treaty
http://www.iht.com/articles/ap/2008/05/30/europe/EU-GEN-Norway-Britain-Cluster-Bombs.php
Ban 'delighted' at adoption of new cluster bomb convention
http://www.un.org/apps/news/story.asp?NewsID=26859&Cr=cluster&Cr1=
UN refugee agency welcomes adoption of pact to ban cluster bombs
http://www.un.org/apps/news/story.asp?NewsID=26868&Cr=Cluster&Cr1=bomb

Non−Proliferation Treaty Deadlock Continues

Military Implications:
[Same as others on this issue] The military should seek alternative means that might be more effective in working with the appropriate agencies to facilitate the NPT negotiations to improve global nuclear safety than is now the case.
Sources:
PREPCOM 2008, 2010 NPT Review
http://www.un.org/NPT2010/SecondSession
Nuclear States Joint Statement
http://www.reachingcriticalwill.org/legal/npt/prepcom08/statements/May09Statement%20by%20P5.pdf
Geneva Talks Pave Way to 2010 NPT Review
http://www.iaea.org/NewsCenter/News/2008/genevatalks.html
NPT Meeting Wraps Up in Geneva
http://www.nti.org/d_newswire/issues/2008_5_9.html#8360B7DE

Nuclear Nonproliferation Treaty Stalemate Continues

Military Implications:
[Same as previous on this issue] The military should seek alternative means that might be more effective to work with the appropriate agencies to facilitate the NPT negotiations to improve global nuclear safety than is now the case.
Sources:
Preparatory Committee for the 2010 Non-Proliferation Treaty Review Conference
http://www.un.org/NPT2010/index.html
Countries Join U.S.-Russia-led Global Initiative To Combat Nuclear Terrorism
http://www.state.gov/r/pa/prs/ps/2007/may/84503.htm
Current Partner Nations to the Global Initiative to Combat Nuclear Terrorism

http://www.state.gov/t/isn/82787.htm

Australia to Propose Panel to Advance Work for the NPT Review in 2010

Military Implications:
The military should explore the Australian initiative as an alternative to facilitate the NPT negotiations to improve global nuclear safety.
Sources:
Rudd takes up fight against nukes
http://www.news.com.au/heraldsun/story/0,21985,23836647-5005961,00.html
Financial Action Task Force, plenary meeting, London, June 18-20, 2008. Chairman's Summary
http://www.fatf-gafi.org/dataoecd/50/1/40879782.pdf
Funding Channels Aid Proliferation, Task Force Says
http://www.nti.org/d_newswire/issues/2008_6_24.html#47DF9DAF

Progress for Enforcing Biological Weapons Convention

Biological Weapons Convention Lacks Enforcement Mechanism, Warns Russian General

Military Implications:
Considering the pressure from high profile officials and organizations, it is reasonable to speculate that the enforcement issue will get on the agenda of the next BWC meetings. The military should collaborate with its counterparts in designing enforcement mechanism to help reduce as much as possible the threats of biological weapons or accidents.
Source:
Enforcement Needed for BWC, Russian General Says
http://www.nti.org/d_newswire/issues/2008_3_12.html#9729B07E

Chemical Weapons Convention Gets New Boost

Military Implications:
[Similar to previous on the same issue] Those with responsibilities in this area should: 1) consider assessing national and international opportunities for assisting in compliance and improving effectiveness of the CWC regulations, and 2) stress attention to and inclusion of new threats.
Sources:
Second Review Conference
http://www.opcw.org/rc2/index.html
Nations Demand Adherence to CW Disposal Deadlines
http://204.71.60.36/d%5Fnewswire/issues/2008/4/8/9cb5bc8a%2D5136%2D4594%2Da750%2Dc5108a7b58ec.html
Chemical arms disposal pricey / China project hit for opaque management, exorbitant costs
http://www.yomiuri.co.jp/dy/national/20080424TDY02307.htm
Japan's efforts toward early destruction of ACW in China
http://www.opcw.org/docs/csp/rc2/en/rc2nat20(e).pdf

IMPROVED COMPLIANCE WITH ENVIRONMENTAL REGULATIONS

International Alliance of Forest Peoples

Military Implications:

Most likely the International Alliance of Forest Peoples will increasingly expand and include forest people from other regions around the world. It is reasonable to speculate that new regulations concerning forest activities will emerge. The military should follow the Alliance's activities both to help them achieve their goals, in order to increase peace and security, and to be prepared for eventual restrictions that might impact military activities.

Source:

International Alliance will unite the forest peoples of the world
http://forestnewswire.com/index.php?option=com_content&view=article&id=122:international-alliance-will-unite-the-forest-peoples-of-the-world&catid=1:latest

Global Map of Human Impacts to Marine Ecosystems

Military Implications:

The new Atlas might add focus for increased action to protect marine environments. The military should increase its efforts to reduce its environmental footprint, and anticipate how it might be called upon to help enforce environmental agreements on international waters.

Sources:

A Global Map of Human Impact on Marine Ecosystems, *Science*, 15 February 2008
http://www.sciencemag.org/cgi/content/abstract/319/5865/948 (abstract)
A Global Map of Human Impacts to Marine Ecosystems
http://www.nceas.ucsb.edu/GlobalMarine

North American Environmental Atlas Online

Military Implications:

The *North American Environmental Atlas* offers a one-stop shop for the most important environmental issues, including protected areas (continuing to be developed), therefore being a useful reference tool for military planning activities.

Source:

Mapping North American Environmental Issues
http://www.cec.org/naatlas/

Water Footprint Measuring System

Military Implications:

[Similar to others on this issue] The military should intensify efforts to improve and accelerate dialogue and cooperation for an international water management system and the design of an international adaptation and mitigation strategy addressing increased water scarcity. Formulating installation water footprints could be a tool for improving water resource use effectiveness and reducing costs.

Sources:

World's Water Needs Grow More Urgent
http://www.ens-newswire.com/ens/mar2008/2008-03-17-01.asp

Experts Seek Answers on Water Footprint
http://www.washingtonpost.com/wp-dyn/content/article/2008/03/27/AR2008032702567.html
Waterfootprint http://www.waterfootprint.org
Water Trade–A Virtual Reality? UNESCO-IHE symposium
http://legacy.citg.tudelft.nl/wmg/dispuut/symposium/index.html

Environmental Damage to Be Criminalized in the EU

Military Implications:
The Directive does not contain an exception clause for the military. Military organizations stationed in the EU countries should assess the impact of the Directive on their operations and in relation to existing Status of Forces Agreements (SOFAs) and other agreements, and as to whether or how it would affect its service members', contractors' and dependents' activities.
Sources:
Protection of the environment through criminal law
http://www.consilium.europa.eu/uedocs/cms_Data/docs/pressdata/en/misc/100525.pdf
EU criminal law to protect the environment
http://www.europarl.europa.eu/news/expert/infopress_page/064-29450-140-05-21-911-20080520IPR29449-19-05-2008-2008-false/default_en.htm
EU agrees to outlaw 'green' crimes
http://www.wbcsd.org/plugins/DocSearch/details.asp?type=DocDet&ObjectId=MzAxNTU

EC Enforces Compliance with EU Environmental Regulations

Military Implications:
[Same as others on similar issues] EC efforts to enforce environmental regulations will trigger further changes in EU Member States' national legislation. Military stationed in the EU countries should increase their vigilance in compliance with EU environmental regulations.
Sources:
Commission takes nine member states to Court over environmental liability
http://europa.eu/rapid/pressReleasesAction.do?reference=IP/08/1025&format=HTML&aged=0&language=EN&guiLanguage=en

EC Enforces Compliance of National Legislation with EU Environmental Regulations
Military Implications:
EC efforts to enforce environmental regulations will trigger further changes in EU Member States' national legislation. Military stationed in the EU countries should increase vigilance in compliance with EU environmental regulations.
Sources:
Ireland: Commission to bring environmental impact assessment case to the European Court of Justice
http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/1524&format=HTML&aged=0&language=EN&guiLanguage=en
United Kingdom: Commission takes legal action for non-compliance with Court decisions
http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/1531&format=HTML&aged=0&language=EN&guiLanguage=en

Waste water treatment: Commission gives Luxembourg final warning, seeks clarifications from Belgium
http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/1533&format=HTML&aged=0&language=EN&guiLanguage=en
Major industrial accidents: Commission continues infringement proceedings against 12 Member States over failure to adopt emergency plans for chemical plants
http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/1534&format=HTML&aged=0&language=EN&guiLanguage=en
Air pollution: Commission takes action over levels of sulphur dioxide and PM10 in member states
http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/1537&format=HTML&aged=0&language=EN&guiLanguage=en
Waste: Commission starts legal action against eight Member States over electronic waste and hazardous substances
http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/1513&format=HTML&aged=0&language=EN&guiLanguage=en

United Arab Emirates Establish Nuclear Agency

Military Implications:

Although the UAE is working closely with the IAEA to assure security standards in the spirit of nuclear non-proliferation, relevant scientific and military community members should consider offering assistance to the new Nuclear Energy Authority on security procedures commensurate with the region's vulnerability.

Source:

UAE to set up nuclear agency
http://www.gulfnews.com/nation/Government/10199893.html

NEW STANDARDS WITH IMPLICATIONS FOR ENVIRONMENTAL SECURITY

New Standards for Handling Robotic Environmental Equipment

Military Implications:

Military personnel responsible for logistical planning for environmental services equipment and for managing emergency operations should familiarize themselves with the contents of this standard relating to the logistics attributes that would help field components integrate the devices into their operations.

Sources:

'Nitty-Gritty' but Vital Data Helps Field Rescue Robots
http://www.physorg.com/news121529153.html
Department of Homeland Security Urban Search and Rescue Robot Performance Standards
http://www.isd.mel.nist.gov/US&R_Robot_Standards

Chemical Emission Certification Extended to Electronic Devices

Military Implications:
Responsible military personnel should investigate the use of these certifications, as they become available, for environmental evaluation of electronic equipment.
Source:
GREENGUARD Expands into Certifying Computers & Electronics
http://www.greenguard.org/Default.aspx?tabid=43&ItemId=451

SAFETY ISSUES

Chemical and Biological safety issues

Half of Transported European Hazardous Waste Could Be Illegal—How Much More Elsewhere?

Military Implications:
Plans for future military-to-military assistance should consider training and logistics support to counter illegal environmental trade.
Sources:
UNEP correspondence with Millennium Project staff
Environment crime now high on the world agenda
http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=530&ArticleID=5764&l=en
The Growth and Control of International Environmental Crime—Background papers
http://www.illegal-logging.info/uploads/Intenvcrime2007backgroundpapers.pdf

Terrorists Could Tap Pharmaceutical Toxins

Military Implications:
This book should be reviewed by those responsible for anticipating vulnerabilities to bioterrorism.
Source:
Pharmaceutical Terrorism—The Bane of Biotech
http://www.stimson.org/pub.cfm?ID=596

Methyl Bromide a Continuing International Concern

Military Implications:
The military should review its and its contractors' worldwide usage of methyl bromide to ensure compliance with existing restrictions, and be prepared for further regulatory actions.
Sources:
Hazardous fumigation must be halted – Greens
http://www.scoop.co.nz/stories/PA0802/S00065.htm
Montreal Protocol: http://www.unido.org/doc/50444

Questions on Bisphenol A Risk Raised Again

Military Implications:

The military should be prepared to phase out its use of this chemical, if the projected determinations conclude that it poses a risk.
Sources:
Canada Could Ban Baby Bottles Containing Bisphenol A
http://www.ens-newswire.com/ens/apr2008/2008-04-22-05.asp
Plastic bottle chemical may be harmful: agency
http://www.reuters.com/article/healthNews/idUSN1513929320080415?sp=true

Nuclear Safety Issues

New Report on Dangers of Radiation Sources

Military Implications:
Civilian-military cooperation should continue to improve methods of preventing abuse of these materials.
Sources:
Radiation Source Use and Replacement. National research Council (Prepublication copy)
http://books.nap.edu/openbook.php?record_id=11976&page=R1
Radioactive Cesium Chloride Should Be Replaced in Medical Equipment
http://nationalacademies.org/morenews/20080220a.html
U.S. urged to curb use of "dirty bomb" ingredient
http://www.reuters.com/article/topNews/idUSN2036258220080220
Government Should Spur Replacement Of Radioactive Cesium Chloride In Medical And Research Equipment; Alternatives Could Lower Potential For Theft And Misuse
http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=11976

Pandemics and Other Health Issues

Environment and Human Health Integration

Military Implications:
Relevant military personnel should review and consider the reports for possible additional inputs of an interdisciplinary approach to reduce security threats and improve force protection.
Sources:
Integrating Environment and Human Health
http://www.ncseonline.org/2007conference/NCSE%2007%20Conf%20Report%20FINAL.pdf
Climate, Poverty and Health: Time for Preventive Medicine
http://www.ncseonline.org/2007conference/07ChafeeReportFINAL.pdf
Environment and Health conference website
http://www.ncseonline.org/2007conference

Potential Health Threats Of Some New Technologies

Nanotechnology

Military Implications:

Military personnel concerned with nanotech issues should review the information generated by these activities to improve military and contractor practices, as well as to assist and cooperate with the organizations working on those issues for enriching their studies.

Sources:

January 2008

1st Annual Conference on Nanotechnology Law, Regulation and Policy
http://www.fdli.org/conf/431/
SAFENANO - The UK's premier site for information on Nanotechnology health and safety
http://www.safenano.org
SAFENANO officially launches SAFENANO Scientific Services
http://www.safenano.org/SingleNews.aspx?NewsID=297

February 2008

European Commission adopts Code of Conduct for Responsible Nanosciences and Nanotechnologies Research
http://europa.eu/rapid/pressReleasesAction.do?reference=IP/08/193&format=HTML&aged=0&language=EN&guiLanguage=en
European Commission gives grant to investigate transatlantic oversight of nanotechnology
http://www.nanowerk.com/news/newsid=4410.php
Regulating Nanotechnologies in the EU and US. Towards Effectiveness and Convergence
http://www.lse.ac.uk/nanoregulation
EU nanotechnology R&D in the field of health and environmental impact of nanoparticles provides summary information on each of 106 projects, 14 of them from the EU's Framework Programme and the other 92 from the EU Member States, together representing a total of some €79 million in grants.
EU nanotechnology R&D in the field of health and environmental impact of nanoparticles
ftp://ftp.cordis.europa.eu/pub/nanotechnology/docs/final-version.pdf
Technology Roadmap for Productive Nanosystems
http://foresight.org/roadmaps/
From Here to There: Nanotechnology Roadmap
http://www.foresight.org/cms/press_center/282
Strategy for Nanotechnology-Related Environmental, Health, and Safety Research
http://www.nano.gov/NNI_EHS_Research_Strategy.pdf
Strategy for nanotechnology-related environmental, health and safety research
http://www.physorg.com/news122212014.html
Risks of nanotechnology remain uncertain
http://pubs.acs.org/subscribe/journals/esthag-w/2008/feb/science/nl_nanorisks.html

March 2008

Federal Toxics Disclosure Law Could Help Inform Public Of Nanotechnology Risks
http://www.nanotechproject.org/news/archive/toxics_law
Forum VI Sixth Session of The Intergovernmental Forum On Chemical Safety
http://www.who.int/ifcs/documents/standingcommittee/nano_oecd.doc
What about explosivity and flammability of nanopowders?
http://www.nanosafe.org/node/910
Nanotech Exposed in Grocery Store Aisles
http://action.foe.org/pressRelease.jsp?press_release_KEY=343

April 2008
Observatory-NANO project http://www.observatory-nano.eu
ObservatoryNANO project kicks off in London
http://nanoforum.org/nf06~modul~showmore~folder~99999~scc~news~scid~3573~.html?action=longview& (free membership required; full text of the article in this Appendix)
ObservatoryNANO: responsible nanotechnology for socio-economic benefit
http://www.safenano.org/SingleNews.aspx?NewsID=382
Project on Emerging Nanotechnolgies – Risk Research Inventory Update Analysis
http://www.nanotechproject.org/process/assets/files/6691/ehs_risk_research_inventory_080416_final.pdf
Europe Spends Nearly Twice as Much as U.S. on Nanotech Risk Research
http://www.nanotechproject.org/news/archive/ehs-update/
NSTI Nanotech 2008 http://nsti.org/Nanotech2008/

May 2008
Carbon nanotubes that look like asbestos, behave like asbestos
News story: http://www.physorg.com/news130510729.html
EPA Petitioned to Stop Sale of 260 Products Containing Nano-Silver
http://www.ens-newswire.com/ens/may2008/2008-05-02-093.asp

June 2008
Commission launches public dialogue on nanotechnologies
http://cordis.europa.eu/fetch?CALLER=EN_NEWS&ACTION=D&SESSION=&RCN=29561
Commission starts public dialogue on nanotechnologies – tapping economic and environmental potential through safe products
http://europa.eu/rapid/pressReleasesAction.do?reference=IP/08/947&format=HTML&aged=0&language=EN&guiLanguage=en
Nanotechnology Homepage of the European Commission http://cordis.europa.eu/nanotechnology/
Perturbational profiling of nanomaterial biologic activity (abstract; full text by subscription only)
http://www.pnas.org/cgi/content/abstract/105/21/7387
Testing the Toxicity of Nanomaterials. A fast screening method could help separate the good from the bad
http://www.technologyreview.com/Nanotech/20861/
Assuring the Safety of Nanomaterials in Food Packaging. The Regulatory Process and Key Issues
http://www.nanotechproject.org/publications/archive/nano_food_packaging/
Use of nanomaterials in food packaging poses regulatory challenges
http://www.enn.com/top_stories/article/37487/print

Underwater Sounds from Human Sources Endangering Marine Life

Sonar Restrictions Debate Continues

Military Implications:
Although this time overruled, the California Court's decision might be reinstated and more research, circumstantial evidence, and increasing advocacy from conservation groups that sonar is harmful, might trigger negotiations for a general ban. Also, the Court's ruling sets a precedent that might be expanded to other regions. If not already being done, preparation monitoring of marine mammals' presence in case of sonar use should become incorporated in Navy policy to allow for responsiveness in the event that further oscillations of policy were to occur.
Sources:
Ruling curbs Navy sonar off Calif. Coast
http://www.upi.com/NewsTrack/Top_News/2008/01/04/ruling_curbs_navy_sonar_off_calif_coast/3754/
Judge orders Navy to stay 12 miles off coast when using sonar
http://www.signonsandiego.com/news/metro/20080103-1643-bn03sonar.html
Bush exempts Navy from no-sonar rule
http://www.usatoday.com/news/washington/2008-01-16-navysonar_N.htm?csp=34
State files another challenge to Navy's sonar training off coast
http://www.signonsandiego.com/news/military/20080122-2122-bn22sonar.html
Navy resumes sonar training off SD coast as legal battle goes on
http://www.sfgate.com/cgi-bin/article.cgi?f=/n/a/2008/01/27/state/n162935S45.DTL

POLLUTION ISSUES

Greenhouse Gas Emissions

Military Implications:
[Same as others on similar issues] The military should document what it is doing to reduce its GHG emissions and what it could do next in anticipation of such requests from a new administration. Increasingly more compelling evidence and warnings on climate change amplify international discourse and increase the emergence of international policies trying to tackle the causes and develop strategies to mitigate climate change effects. Hence, the military should be doing its part in reducing greenhouse gas emissions and preparing to help mitigate the human-made and natural catastrophes that could ensue.
Sources:
Greenhouse gas hits record level
http://www.metro.co.uk/news/climatewatch/article.html?in_article_id=147343&in_page_id=59
NOAA ESRL 2008 Global Monitoring Annual Conference
http://www.esrl.noaa.gov/gmd/annualconference/
Target Atmospheric CO2: Where Should Humanity Aim?
http://arxiv.org/ftp/arxiv/papers/0804/0804.1126.pdf
Clock Running Out on Irreversible Climate Change – Part I
http://yaleglobal.yale.edu/display.article?id=10657
G8 Environment Ministers Agree on 2050 Climate Goal
http://www.ens-newswire.com/ens/may2008/2008-05-27-04.asp

State and Trends of the Carbon Market 2008
http://world-wire.com/news/0805070001.html
From Bali to Poznan: New Issues, New Challenges
http://www.envirosecurity.org/activities/diplomacy/gfsp/climate

Restrictions on Plastic Bags Expanding

Military Implications:
The military should review its usage of plastic bags (especially the thinnest varieties) and plan for their eventual replacement. This would apply primarily to commissaries and PXs, but could extend to convenience uses for other functions.
Sources:
Plastic bag ban
http://www.chinadaily.com.cn/opinion/2008-01/10/content_6383869.htm
China boosts global war against menace of the plastic bag
http://www.guardian.co.uk/environment/2008/jan/12/plasticbags.recycling
China bans plastic shopping bags
http://www.cbc.ca/consumer/story/2008/01/08/china-bags.html
Retailers oppose bag ban
http://www.stuff.co.nz/4354751a13.html
China bans free plastic bags
http://edition.cnn.com/2008/WORLD/asiapcf/01/09/china.plastic.bags/index.html

NEW INITIATIVES AIMING TO INCREASE ECO-EFFICIENCY

New International Financial Alliance to Support Biodiversity

Military Implications:
Relevant military personnel should follow the decisions of this alliance to anticipate impacts on international bases and training areas and for planning responses.
Sources:
A new universal global alliance for biodiversity protection established in Bonn
http://www.cbd.int/doc/press/2008/pr-2008-05-30-cop9-en.pdf

State of Green Business 2008

Military Implications:
The report is a good reference for improving "green" practices.
Source:
Just published — State of Green Business 2008
http://stateofgreenbusiness.com

New "Green IT" Software under Development

Military Implications:

Military personnel responsible for the management of large computer installations or networks should test this software for possible large-scale use.
Sources:
Oxford University launches research project for low carbon computing
http://www.eci.ox.ac.uk/news/press-releases/080317low-itc.pdf
Oxford University to Develop Free Green Computing Software
http://www.greenercomputing.com/news_third.cfm?NewsID=55791

Energy/Performance Benchmark for Workstations under Development

Military Implications:
Personnel responsible for acquisition of workstations should consider the use of this benchmark, when available, for equipment evaluation with respect to environmental impact.
Source:
SPEC Developing Benchmark for Workstation Power Use, Performance
http://www.greenercomputing.com/news_third.cfm?NewsID=55773

Environmentally Friendly City in UAE Offers Cooperation Opportunity

Military Implications:
CENTCOM personnel should consider contacting UAE authorities to explore how environmental security issues could be included in research and training programs at the Masdar Institute, an MIT-affiliated graduate-level academic research center that will be the first phase of the project to be completed.
Source:
Car-free, solar city in Gulf could set a new standard for green design
http://www.iht.com/articles/2008/02/05/healthscience/05city.php

New International Financial Alliance to Support Biodiversity

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http://www.cbd.int/doc/press/2008/pr-2008-05-30-cop9-en.pdf