The Millennium Project
http://www.millennium-project.org

WORLDWIDE EMERGING ENVIRONMENTAL ISSUES AFFECTING THE U.S. MILITARY

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Summarizing Environmental Security Monthly Scanning
July 2008––June 2009

1. Executive Summary……1

2. ENVIRONMENTAL SECURITY MONTHLY SCANNING ITEMS…….....16

A Preventing or repairing military damage to the environment

B Preventing or responding to environmentally caused conflicts

C Protecting the environment due to the moral value of the environment itself

3. MILITARY IMPLICATIONS AND SOURCE……134

Let us renew our commitment to preventing the exploitation of the environment in times of conflict, and to protecting the environment as a pillar of our work for peace.

UN Secretary-General Ban Ki-moon
International Day for Preventing the Exploitation of the Environment in War and Armed Conflict, November 6, 2008

[Climate change] is a global problem requiring the involvement of the UN, NATO, EU and other regional organisations. NATO forces must develop the resiliency to adjust to changing climate and react to its consequences.

New Horizons, The Hague Centre for Strategic Studies, March 2009

1. EXECUTIVE SUMMARY

The scope and scale of the effects of climate change—ranging from changes in weather patterns to loss of livelihoods and disappearing states—has unprecedented implications for political and social stability. Global strategies are needed to address anthropological causes of climate change and increasingly catastrophic environmental deterioration. International military and civilian collaboration is necessary to create adaptation policies and mechanisms to reduce potential environmentally induced conflicts.

Environmental diplomacy and environmental considerations are increasingly integrated into conflict prevention and peacekeeping efforts as well as international efforts for confidence building. Nontraditional security issues—including environment, migration, and social development—have become standard considerations in security planning. Since it is well acknowledged that environmental security cannot be addressed by any nation alone, military strategies and geopolitics are being reshaped around complex issues and within multilateral frameworks. Increasingly powerful sensors connected by satellites and advancing software improve the ability to identify environmental threats and crimes. Hence, the capacities of international institutions to implement current legal agreements and make new more-powerful legal instruments are being strengthened. As a result, environmental damages that people and organizations got away with in the past are less likely to escape detection and punishment in the future.

The purpose of the monthly environmental security 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 military.

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 between July 2008 and June 2009 organized around this definition and by themes. More than 300 items have been identified during the period July 2008–June 2009 and over 1,500 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 website http://www.millennium-project.org/millennium/env-scanning.html and the version with Military Implications is available on the AEPI website http://www.aepi.army.mil/rpt-weei.html.

Preventing or Repairing Military Damage to the Environment

UNEP reports that since 2000 there have been more than 35 major conflicts and some 2,500 disasters worldwide, affecting over 2 billion people. At least 18 violent conflicts since 1990 have been driven by factors related to natural resources and/or environmental degradation, and 40% of all intrastate conflicts since1960 have a link to natural resources. While these are twice as likely to relapse into conflict within five years, less than 25% of relevant peace agreements address the environmental or resource management aspects.

Although the natural environment is protected under Protocol 1 of the Geneva Conventions, "this protection is often violated during war and armed conflict. Water wells are polluted, crops torched, forests cut down, soils poisoned, and animals killed, all in order to gain military advantage," comments UN Secretary-General Ban Ki-moon.[1] Since lasting peace in war-torn regions like Darfur and Afghanistan is not possible without restoration of the ecosystem to support livelihoods, the scope and tasks of the military and peacekeeping operations are expanding.

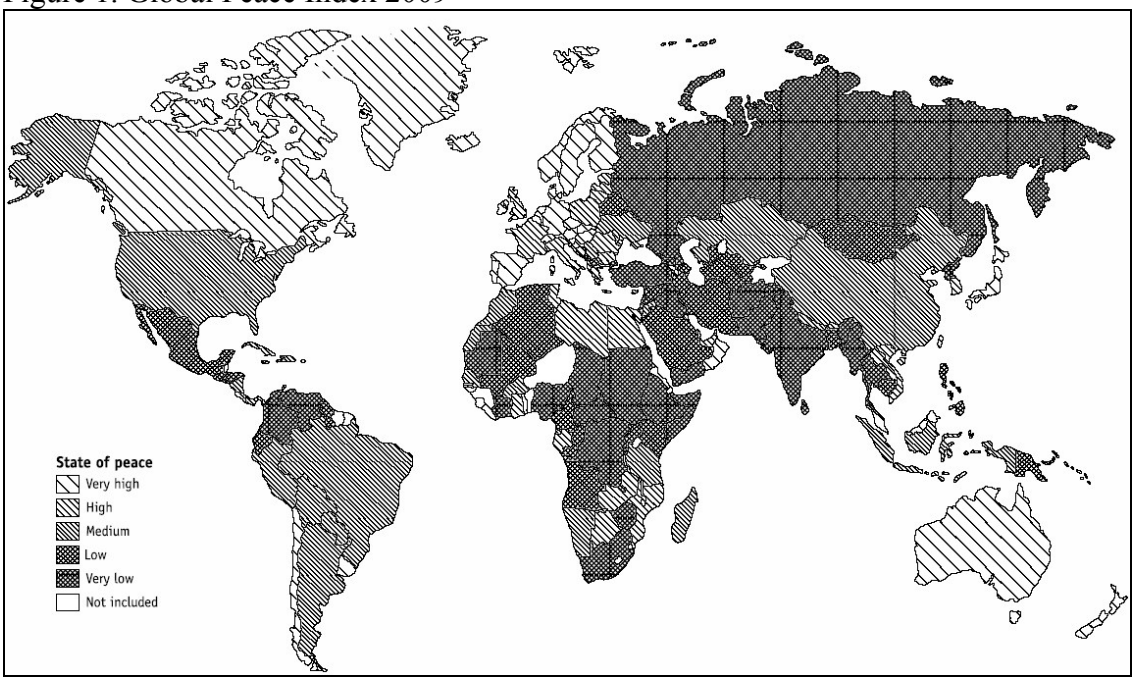
Military organizations should systematically integrate environment in conflict analysis and all phases of operations planning, as well as broaden their role by showing leadership in protecting the environment, increasing energy efficiency through procurement and operations, R&D centers of excellence, and the transfer of knowledge. Including environmental factors in military actions gives strategic advantages in combat and post-conflict operations; protects the health, safety, and security of the troops; and develops diplomatic relations and the confidence of local populations and neighboring countries, thus increasing the missions' success. Security experts emphasize that energy and environmental standards should be considered in security-related reconstruction and stabilization activities (e.g., improved agricultural practices and alternative energy systems), along with information sharing to assess future needs of individual communities or countries.

In 2007, the UN Security Council held its first debate on the security implications of climate change, and many Council members considered the issue a top priority for their governments. Support for Brazil's permanent seat on the Security Council is largely due to its potential for providing leadership on environment-related issues. "The world has moved from a global threat once called the Cold War, to what now should be considered the Warming War," says Afelee Pita, Tuvalu Ambassador to the UN.

Since conflict and environmental degradation are exacerbating each other, they should be addressed simultaneously. Comparing world peace status (see Figure 1) with potential security risks triggered by climate change effects and environmental degradation (e.g., global sea level rise, temperature change, water scarcity, and desertification) could help address present vulnerabilities efficiently and avoid foreseeable ones.

[1] Secretary-General Ban Ki-moon speaking on the International Day for Preventing the Exploitation of the Environment in War and Armed Conflict, November 6, 2008.

Figure 1. Global Peace Index 2009



Source: Economist Intelligence Unit (for the Institute for Economics and Peace)

Middle Eastern countries are among the least environmentally sustainable, and conflict has caused massive damages to ecosystems from Iraq to Lebanon and North Africa. Many post-conflict health and environmental impact assessments are ongoing, as are liability disputes. A motion submitted to the Security Council is requesting Israel to pay Lebanon nearly $1 billion for environmental damages caused during the 2006 Second Lebanon War (including, inter alia, the cost of UN cleanup of the oil spill after Israel bombed a large refinery). In May 2009, UNEP conducted a post-conflict environmental assessment in the Gaza Strip on the impact of the Israel invasion of December 2008–January 2009 in order to make rehabilitation recommendations.

"It will take centuries to restore the natural environment of Iraq" said Iraqi Environment Minister Nermeen Othman, referring to the environmental catastrophe caused by the conflict: unexploded bombs and 25 million land mines littering the land, hazardous waste and leaking poison from destroyed factories, chemical waste, rubble and trash, and chemical weapons and depleted uranium munitions that have created 105 contaminated areas. More than 60% of Iraq's fresh water is polluted.

Environmental degradation and hazardous ordnance leftovers in many post-conflict areas around the world threaten the livelihoods and health of current and future generations and may constitute an impediment for lasting peace. Leaking abandoned ordnance since World War II or dangerously high levels of heavy metals and other toxic chemicals related to military exercises are contaminating the oceans, endangering the marine ecosystem and human health.

The Portfolio of Mine Action Projects 2009 notes that about 75 countries are affected by landmines or explosive remnants of war, and half of the nearly 6,000 casualties around the world

last year were children. The over 300 actions to be conducted in 2009 in 33 countries, territories, or peacekeeping missions will cost $459 million.

The Convention on Cluster Munitions was opened for signature in December 2008. It bans states from producing, trading, and using cluster munitions and asks them to discourage other nations from using cluster munitions in joint military operations. By mid-2009, it had 98 signatories and 8 ratifications out of the 30 required for its entry into force. Dozens of signatory countries are stockpilers, former producers, and users of the weapon, including 18 of 26 NATO nations.

The controversy over the environmental and health effects of the use of depleted uranium munitions continues. 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. In the meantime, there are advances on nuclear non-proliferation and nuclear disarmament and preparation for the 2010 Nuclear Non-Proliferation Treaty review.

Global Zero is a new effort launched by international leaders to eliminate all nuclear weapons worldwide within 25 years. The EU suggests new measures, including a worldwide prohibition on nuclear tests. However, the threat of radioactive material use by terrorist or malicious forces remains high. The IAEA reports that nearly 250 incidents involving theft or loss of nuclear or radioactive material were reported during the year ending in June 2008 and that much of that material is not subsequently recovered, or sometimes material that was never reported missing is found. The new UN Regional Center for Peace and Disarmament in Asia and the Pacific opened in Nepal to counter possible nuclear smuggling by terrorist and criminal groups in that region.

The Organization for the Prohibition of Chemical Weapons reports that of the total destroyed amounts of chemical weapons declared by states possessing them were: 44% of category 1, around 52% of the category 2, and all those of category 3. Three countries have finished the operations. Russia—the largest possessor—destroyed a third of its stockpile; the U.S. destroyed 60%, including the most dangerous ones; work continues in India. Japan has begun the cleanup of chemical weapons abandoned in China during World War II. Libya has yet to begin the process. However, meeting the 2012 deadline set by the Chemical Weapons Convention is a challenge. 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.

New technologies are offering improved detection, cleanup, monitoring, and surveillance possibilities. 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. They save solders and civilians' lives, remove environmental footprint of military operations, and restore the environment for reinstating livelihood. However, future autonomous robotic weapon systems (without human decisionmaking control) are increasing vulnerability and concern over possible catastrophes.

There are no international standards to help prevent proliferation of weapons of mass destruction and future use of hi-tech systems by non-state actors. The development of synthetic biology,

cognitive science, nanotechnology, electromagnetic pulses, and other hi-tech advancements, combined with the availability of information via the Internet and low-cost components necessary to produce hi-tech weapons by individuals or non-state actors, as well as the increase of terrorism and social unrest (often exacerbated by environmental factors), all increase the threat of SIMAD (single individuals massively destructive). "E-bombs" based on electromagnetic pulses are capable of destroying the electronics in civilian aircraft, suitcase-sized electronic warfare devices can disable the power grid of an entire region, and research on computer-mediated telepathy such as Silent Talk might one day be used to intercept and distort thoughts.

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.

Preventing or Responding to Environmentally Caused Conflicts

The number and intensity of natural disasters is on the rise, according to EM-DAT statistics. In 2008, a total of 354 natural disasters were recoded, with an estimated 214 million victims, 80% of whom in Asia. The *Right to Survive* report by Oxfam International reveals that the number of people affected by the 6,500 climate-related disasters recorded since 1980 has doubled in 30 years. By 2015 it might further increase by 54%, to an average of more than 375 million people per year. This might overwhelm emergency organizations. The Global Humanitarian Forum estimates that by 2030, climate change would affect more than 660 million people and economic loses could rise to $340 billion a year.

Weather pattern changes observed now in some parts of the world were not expected until 2020, and "worst case" scenarios are already becoming reality. There is high agreement that it is "unlikely" the world would manage to limit warming to 2°C (3.6°F) above pre-industrial levels. Most experts estimate a temperature rise of 3–4°C (5.4–7.2°F) by the end of the century, while an average 6°C (10.8°F) is not ruled out. Due to the physiological limits of the human body, temperature rise by 7°C (12.6°F) over pre-industrial levels would render many parts of the globe uninhabitable, a 5°C (9°F) global warming over present values might reduce human population to 1 billion, while 10°C (18°F) would encompass most of today's population.

Increased social unrest in the poorer regions seems inevitable. The highest population growth is in the poorest areas that have contributed the least to GHG emissions but are likely to get hit the hardest by climate change. The global ecologic deficit continues to grow, temperature changes are affecting insect and hence disease and agricultural patterns, water is becoming scarcer, sea levels rise, and desertification continues. Population density increases the impacts on the deltas of Ganges, Mekong, and Nile Rivers, almost all of China, Southeast Asia, the Middle East, and West Africa.

Rising sea levels and melting ice caps will redraw physical and political boundaries, trigger sovereignty tensions, and potentially force the evacuation of some island nations in the South Pacific. The Presidents of Maldives and Kiribati are calling on the international community to

help relocate their nations as sea level rise might cover their islands. The Australian Defense Force warns of possible conflict in the South Pacific triggered by increased illegal immigration and fishing and potential failed states as a consequence of climate change and rising sea levels.

Satellite observations reveal that since 1993 sea level has risen by 3.3 mm a year, almost double the rate of the previous 50 years. While for 1993–2003 about half of the sea level rise was due to the oceans expanding as they became warmer and the other half was due to shrinking land ice, since 2003 about 80% of the annual sea level rise can be attributed to land ice loss from glaciers, Greenland, and Antarctica. Computer models show that based on new estimates, melting of one of the world's largest ice sheets could alter Earth's field of gravity and even its rotation and could disproportionately raise sea levels more on the west and east coasts of North America. Other consequences, such as salinity dilution, could also have significant effects on the world's climate and ocean currents.

The Arctic is warming faster than the rest of the world. In 2008, for the first time in recorded history, both the Northwest Passage over North America and Russia's Northeast Passage were ice-free, and sea-ice is set to be at a record low in 2009. The thawing of Arctic sea ice opens up the Northwest Passage as an international shipping route and the 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 latest Russian assessment of security threats up to 2020 notes that fights over the world's energy reserves could trigger military clashes, specifying the Arctic as a vulnerable area along with the Middle East, Central Asia, and the Caspian Sea.

In the South China Sea, China, the Philippines, Vietnam, Taiwan, Indonesia, and Malaysia have overlapping claims, with China asserting sovereignty over a series of islands and the respective seabed reserves. A vast area around the Falkland Islands, South Georgia, and South Sandwich Islands in the South Atlantic, with seabeds rich in oil and minerals, is the object of overlapping claims from the UK and Argentina. Many other countries have also made recently submissions or informed the CLCS of their intention to claim extensions of their continental shelf. In some cases, the claims are linked to previous unresolved international conflicts and boundary disputes. However, the Commission's rulings are only advisory and intended to be used for negotiations and, if necessary, arbitration.

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 subtropics 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. Kolahoi glacier (the only year-round source of fresh water for the Kashmir valley) might be all gone in 10 years, threatening the livelihoods of millions and the perspective of lasting peace in the region. Bolivia's 18,000-year-old Chacaltaya glacier completely melted away this year, and the World Bank estimates that most of the Andes' glaciers will disappear within 20 years, affecting the livelihood of people in Peru, Ecuador, and Bolivia. New evidence shows that the Pyrenees have lost almost 90% of their glacier ice over the past century, and scientists estimate that along with other European glaciers, they might disappear completely within a few decades. In Asia, as the

storage capacity of glaciers declines, short-term flood risks increase, followed by decreasing water flows in the medium and long term, threatening food production in some of the world's most densely populated regions.

Some 12 million hectares of land are lost yearly due to degradation and environmental causes. Desertification threatens regions with already high vulnerability: nearly 70% of agricultural lands in the Arab region and 65% of those in Africa—where 60% of the population depends on agriculture. By 2020, water shortages might affect 250 million people in Africa, and agricultural productivity could decline 50%; in the meantime, population is expected to increase from 967 million to 2 billion in 2050. The situation might be exacerbated by several food-importing countries, including China, South Korea, Saudi Arabia, and the UAE, that have started to buy or lease farmland in poor countries in Africa, Latin America, Central Asia, and Southeast Asia in order to address their food and water security.

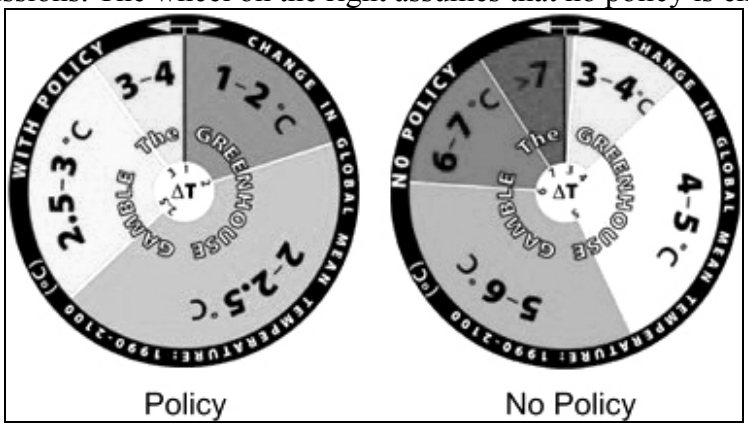
Without more serious mitigation and adaptation measures, mass migration and conflicts seem inevitable due to climate change, desertification, falling water tables, and other contributing environmental factors. Nevertheless, there is no adequate international system or framework to cope with environmentally induced migration. Estimates of the number of potential environmentally displaced people by mid-century, range from IOM's 200–250 million people to Christian Aid's close to 1 billion. Most industrial countries suggest that environmentally induced migration should be covered by a different framework than the UN convention on refugees. Unlike other refugees, who could return home when the causes of persecution are gone, those displaced by irreversible impacts of climate change will require permanent resettlement. Some displacement and migration could be prevented through adaptation measures, but poor countries don't have adequate resources and mechanisms.

The UN estimates that $86 billion per year might be needed by 2015 for poor countries to adapt to global warming, while some aid groups are calling for at least $50 billion. Although richer countries pledged about $18 billion to help poorer ones adapt to climate change, less than $1 billion has actually been disbursed. Over the past three years the Global Environment Facility distributed $760 million, but about 33% of that went to China, India, and Brazil, while the 49 poorest countries received less than $100 million. Although the Least Developed Countries Fund established to help the poorest countries implement urgent projects to adapt to climate change might need $1 billion, only $172 million was pledged. Studies show that $1 invested in disaster preparedness saves between $4 and $7 in humanitarian relief and reconstruction costs after a disaster happens.

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. A five-year work plan on climate change and health aims to enhance monitoring and assessment capacity. In response to the A(H1N1) outbreak, WHO has applied the International Health Regulations 2005 that entered into force in 2007. Some experts consider that this will test the regulation's efficiency and countries' compliance, as well as provide an opportunity for increased preparedness for eventual future acts of bioterrorism and to expedite research for a vaccine that would protect against a larger spectrum of viruses.

An MIT Integrated Global Systems Model illustrates potential situations with and without "policy change" to curb greenhouse gas emissions. The results are shown in Figure 2.

Figure 2. MIT Integrated Global Systems Model: temperature increase over the next 100 years. The wheel on the left depicts researchers' estimation of the range of probability of potential global warming over the next 100 years if aggressive policy change is enacted on curbing greenhouse gas emissions. The wheel on the right assumes that no policy is enacted.



Source: Image courtesy of the MIT Joint Program on the Science and Policy of Global Change

Protecting the Environment Due to Its Inherent Moral Value

The magnitude of the economic turmoil that focused world's attention on financial deficits, coupled with increased environmental disasters, helped improve the understanding of potential long-term impacts of the increasing ecological deficit. Comparably, however, the environmental deficit is in most cases irreparable.

Earth Overshoot Day was September 23 in 2008—the day when humanity has used what nature can regenerate annually—and it is moving earlier each year, according to Global Footprint Network. The *Living Planet Report 2008*, which documents the extent of human pressure on the planet, reveals that 75% of the human population lives in countries that are "ecological debtors," demanding more biocapacity than they have within their borders.

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. There are efforts for better integration of existing MEAs that cover related issues. An ad hoc joint working group was established to assess ways to enhance cooperation and coordination among the Basel, Stockholm, and Rotterdam Conventions. Policymakers and experts reinforce the need to apply the precautionary principle in the context of environmental safety.

Evaluation mechanisms of the effectiveness of the agreements are improving, and 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. 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 of international concern.

Some experts suggest that the likelihood of environment-related litigation might increase, as sectors and companies that are considered serious contributors to climate change or promoters of public misinformation or disinformation could be held liable for climate-change effects. The same legal logic that took cigarette companies to court would be used. WWF–UK suggests the development of a new UN framework to compensate victims of climate change in developing countries and an international compensation fund to be set up by some future UN treaty. The trend for applying the "polluter pays" principle is increasing and the model of the European Environmental Liability Directive might be emulated in other parts of the world. The European Commission opened several infringement procedures against member states for noncompliance with EU environmental legislation.

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

Negotiations have begun for a post-2012 treaty to reduce greenhouse gas emissions, and although most scientists warn that the efforts are already too late and too little, there is skepticism that a successful and effective post-Kyoto global treaty would be concluded in Copenhagen in December 2009. The treaty should provide a framework for curbing greenhouse gas emissions beyond to 2050, with intermediate targets for 2020. At the Poznan negotiating conference, a group of 43 small island states, worried that rising seas could wipe them off the map, called for tougher goals for emissions reductions and limiting global warming to a maximum of 1.5°C (2.7° F) above pre-industrial times. "We are not prepared to sign a suicide agreement that causes small island states to disappear," said Selwin Hart of Barbados, a coordinator of the Alliance of Small Island States. Some argue that the effectiveness of the treaty and actions depends of the "G-2"—China and the U.S. Meanwhile, questions are growing about better enforcement mechanisms of the Kyoto Protocol to compel governments to respect their commitments.

New findings show that some compounds developed to replace banned chemicals are powerful greenhouse gases contributing to global warming. Therefore, experts are targeting more than a dozen new synthetic compounds for inclusion in the post-Kyoto treaty as potent greenhouse gases. The list includes nitrogen trifluoride (NF3)—used for LCD televisions, computer circuits, and thin-film solar cells—which is estimated to be an about 17,000 times more potent as a greenhouse gas than CO_2 and which was developed to replace perfluorocarbons covered by the Kyoto Protocol.

Box 1

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

- Convention on Cluster Munitions (opened for signature in December 2008)
- United States restrictions on export of cluster munitions (adopted in March 2009)
- International Convention for the Suppression of Acts of Nuclear Terrorism (entered into force in July 2007)
- EU resolution to lead negotiations for a global treaty to ban depleted uranium weapons (adopted in May 2008)
- International Convention for the Safe and Environmentally Sound Recycling of Ships (adopted in May 2009)
- International Convention on the Control of Harmful Anti-Fouling Systems on Ships (entered into force in September 2008)
- Revised MARPOL Regulations for the Prevention of Air Pollution from Ships (adopted in October 2008)
- Stockholm Convention on POPs updated with nine new chemicals (May 2009)
- Stockholm Convention continued negotiations for noncompliance mechanisms (agreement expected in 2011)
- Rotterdam Convention on PIC updated with new compounds (October 2008)
- Advancing discussions for cooperation among the Rotterdam, Basel, and Stockholm Conventions (October 2008)
- Convention on the Protection of the Underwater Cultural Heritage (entered into force in January 2009)
- Negotiating text for a post-2012 treaty on the reduction of greenhouse gas emissions (to be negotiated in December 2009, in Copenhagen)
- Tougher regulations for mandatory greenhouse gas emission targets being adopted by countries, regional authorities, local governments, and industries
- Network of Marine Protection Areas (to be adopted by 2012)
- EU ban on all exports of mercury (to take effect in March 2011)
- Airline industry mandatory participation in the EU Emissions Trading System (starting in January 2012)
- Shipping industry participation in the EU Emissions Trading System proposed from 2013
- EU Batteries Directive (entered into force in September 2008)
- Revision of the EU WEEE and RoHS for greater coherence with other EU regulations (December 2008)
- EU alignment of legislation on classification, labeling, and packaging of substances and mixtures with the UN Globally Harmonized System (December 2008)
- EU protection of the environment through criminal law (proposal approved in May 2008)
- Restrictions on plastic bags in China and India (effective 2008 and 2009, respectively)
- A global ban on mercury (in negotiation)

The World Meteorological Organization estimates that in 2008 the ozone hole over Antarctica was 8% larger than its peak in 2007 and that it might take another 50 years to completely recover. Nevertheless, computer models show that without the Montreal Protocol, the situation would have been worse.

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. It adopted legislation to include aviation in the EU Emissions Trading System starting January 1, 2012, while the shipping industry is proposed to be included from 2013. However, climate scientists argue that the two industries should also be subject to emissions cuts regulations.

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 gets increasingly involved in the design of local and regional regulations, in many cases with the help of international NGOs. Fiscal stimulus packages adopted to help address the economic crises also include important measures involving renewable energy and environmental issues.

Falling water tables around the world increase the likelihood that abuse of international groundwater aquifers will cause conflicts. Aquifers contain 100 times the volume of surface fresh water but are largely not covered by international regulations despite their transboundary conditions and their great environmental, social, economic and strategic importance. The draft Convention on Transboundary Aquifers, submitted to the General Assembly in October 2008, aims to create a framework for proper management and exploitation of underground water resources, calling on states to cooperate on aquifers' use and to prevent and control their pollution. It would apply to 96% of the planet's freshwater resources. Meantime, UNESCO published the first detailed map of 273 underground transboundary aquifers, including information about the water's quality and rate of replenishment.

Only 0.7% of the world's oceans are designated as protected, far from the goal of 20–30% by 2012 set at the 5th World Parks Congress in 2003. Scientists note that the oceans are now more acidic than they have been for 800,000 years, which could have disastrous consequences for ecosystems and the livelihoods of millions of people. Since climate change affects weather patterns, ocean currents, and temperatures, with impact on ecosystems and animals' migration, areas set aside for wildlife protection may have to change as well. None of the over 4,500 marine protected areas worldwide has been designed with climate change taken into account. Hence, scientists are speculating about possibilities of drawing "roving" protected areas in light of changing conditions. Although technical advances facilitate the task of identifying ecosystem changes, the issues of governance might be a greater challenge. The UN Convention on the Law of the Sea is recognized as the legal framework for all activities in the oceans and seas, but debate continues on how the convention applies to marine genetic resources in areas outside national jurisdictions.

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 hazardous 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.

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. The Stockholm Convention on Persistent Organic Pollutants was updated with 9 new chemicals for elimination in addition to the 12 already listed. Noncompliance mechanisms will be further discussed at the next Conference of the Parties, in 2011. The Intergovernmental Forum on Chemical Safety will be integrated into the International Conference on Chemicals Management as an advisory body providing an open, transparent, and inclusive forum for addressing new and emerging issues related to sound chemicals management.

Policymakers and experts reinforce the need to extend globally the regulations on heavy metals and to tackle the widening gaps among countries in following chemical safety policies. The legislation banning all exports of mercury from the European Union goes into effect in March 2011. The EU is the world's biggest exporter, responsible for about 25% of the global mercury supply. The export ban is part of the EU's strategy for addressing mercury pollution globally.

The relevance of existing regulatory systems should be reviewed in view of emerging new technologies, such as nanotechnology and synthetic biology. "Garage" bioengineering done by amateur scientists is now possible, increasing the likelihood of accidental or intentional release of harmful new organisms into the environment. The Biological Weapons Convention may be updated at the 2011 next review conference to cover such potential new threats.

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 proliferating rapidly around the world. 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, the Russian Federation launched its first certification system for industrial nanotechnology production, pressure increases in Australia for nanotech safety regime, 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, corporations are increasingly under stockholders' pressure for nanotech disclosure, and the Intergovernmental Forum on Chemical Safety decided to include manufactured nanomaterials on its agenda.

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 carrying out the UN Platform for Space-based Information for Disaster Management and Emergency Response, and the European Kopernikus joint earth observation system, which in addition to monitoring environmental events will enhance people's safety by providing early warnings of natural disasters and a basis of enhanced modeling activities to help better understand the drivers of climate change. The Space Council highlighted the need to improve the coordination between civil and defense programs. As commercial and government space activities proliferate, negotiations began for an international regulation for space debris and a space traffic control system.

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Some General Patterns and Insights

The link between human and environmental security is widely accepted by military, scientific, and political actors alike. The environment is increasingly an important component in forecasting future conflicts and is ever more integrated into national and global security strategies.

Negotiations and policies to address climate change and environmental degradation top the agenda of international and national governments, official forums, corporations, NGOs, and academic institutions. The trend of adopting proactive rather than reactive regulations is accelerating.

International environmental governance is improving with new regulations and improved efficiency of the existing ones, new monitoring and accountability mechanisms, and strengthened multilateral international cooperation and organizations. The time is shortening between the design of multilateral environmental agreements and receipt of enough government ratifications to come into force.

Nevertheless, MEAs can conflict with national economic or political interests, generating issues of noncompliance with international treaties, lack of cooperation with international organizations, and deadlock in many international treaty negations. These tend to be related to greenhouse gas emissions, nuclear nonproliferation, responsibilities for environmental impacts, and outer-space security issues.

Environmental issues are now recognized as serious "conflict threat multipliers," and unless environmental and other conflict factors are simultaneously addressed, neither are likely to be resolved successfully.

Environmental security roles for the military are growing. Militaries will be increasingly called on to assist in the aftermaths of natural and humanmade disasters, address conflicts triggered by environment factors (e.g., Sudan), assist in restoring the environment after conflicts (e.g., Iraq),

and reduce their environmental impacts. They may also become involved in future MEA enforcements.

Climate change and resource scarcity are creating new geopolitical areas of concern and political instability. These increase the likelihood of failed states (e.g., Haiti, Somalia), jeopardize alliances (potential conflicts over Arctic oil and natural gas), overstretch peacekeeping operations (these are not a series of hot spots but are worldwide and accumulative, and they occur simultaneously), and give additional roles to the military in combat and peace negotiations. The scale of political, financial, humanitarian, and security implications of the effects of climate change are unprecedented, the causes are generally known, and the consequences can largely be forecast. Nevertheless, coordination for effective and adequate action is yet incipient, and environmental problems worsen faster than response or preventive policies are being adopted.

Experts warn that "worst case" scenarios are already becoming reality, average temperatures increase by the end of the century could be 3–4°C (5.4–7.2°F), but 6°C (10.8°F) is not ruled out, while sea level rise projections vary from 30-40 cm (11.8–15.7 inches) to up to 140 cm (55.1 inches). Oxfam International estimates that by 2015, the number of people affected by climate-related disasters might increase by 54%, to an average of more than 375 million people per year, potentially overwhelming the emergency organizations.

Increasing natural disasters due to climate change are likely to have greater impacts in areas of high political vulnerability. Hence, international frameworks and agreements are needed to guide decisions on when human rights and environmental security overrule sovereignty and international intervention is warranted. Similar debates concern prioritization criteria—should the number of people affected prevail, as in Bangladesh for instance—or should it be political or sovereignty defense, as in the case of some Pacific small island states.

Without more serious mitigation and adaptation measures, mass migration and conflicts seem inevitable due to climate change, desertification, falling water tables, and other contributing environmental factors. Nevertheless, there is no adequate international system or framework to cope with environmentally induced migration estimated to reach 200–250 million people by 2050.

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.

Future pandemic threats are increasing due to globalization, climate change, and diversification of pathogens. As a result, WHO, their member states, and their militaries are improving global systems for countering pandemics from either natural or terrorist causes.

New environmental pollution detection and cleanup techniques, plus ICT and robotics, are reducing the environmental footprints of the military. The technological ability to identify environmental threats and crimes is becoming cost-effective through new detection systems—

nanotech environmental sensors, which can be connected to global information systems via satellite, potentially making environmentally damaging actions known instantaneously and worldwide. However, the accelerating rate of technological advancements has also fundamentally changed the spectrum of threats to the environment and human health and security. International standards are needed to address potential dangers associated with hi-tech developments and use and the increasing threat of SIMAD.

Space technology will play an increasingly helpful role in Earth surveillance for a variety of purposes, from early warnings of natural disasters to improving compliance with MEAs. But the value of such satellite systems can be improved by better local on-the-ground coordination, training in applications, and coordination between civil and defense programs. International regulations are also needed to address the increasing problem of space debris making space access and use less safe. The UN Outer Space Treaty might need to be reconsidered and broadened in view of the increasing use of space for military objectives.

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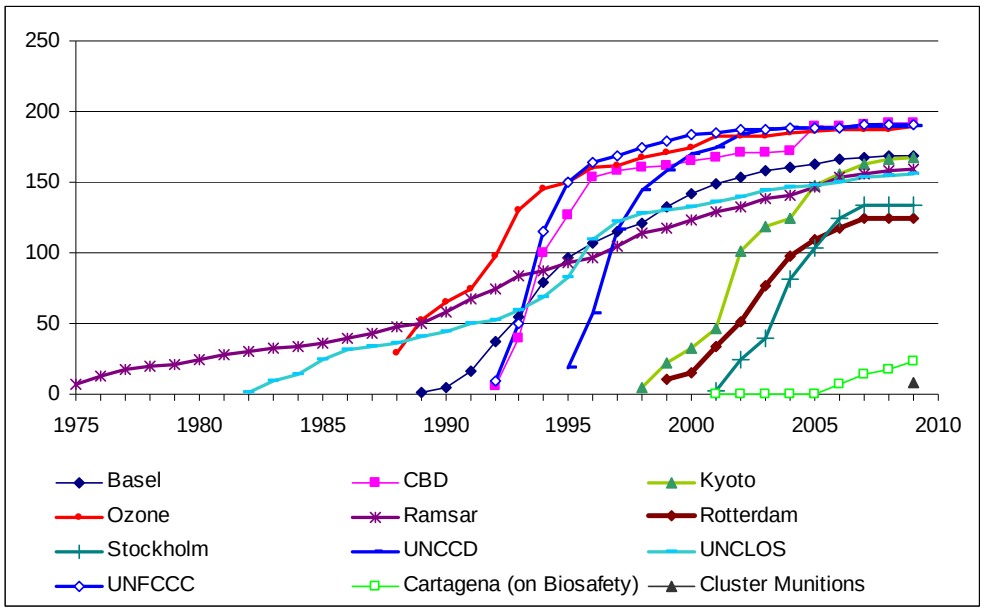
Environmental security analysis should include the impacts of new kinds of weapons; asymmetrical conflicts and warfare; increasing demands on natural resources; urbanization (which makes more people dependent on vulnerable public utilities); environmental degradation and climate change; continued advances 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. Figure 3 reveals significant efforts on ratifications; however, more is needed in the area of implementation of the regulations, as well as in developing a global environmental consciousness.

Figure 3. Number of parties to multilateral environmental agreements, 1975–2009



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

2. ENVIRONMENTAL SECURITY MONTHLY SCANNING ITEMS

A. Preventing or repairing military damage to the environment

ENVIRONMENTAL SECURITY RISES ON THE INTERNATIONAL POLITICAL AGENDA

Environmental Considerations Should be Included in Planning Military Operations
International Guidance on the Treatment of Individuals in War May Eventually Guild International Standards on the Treatment of the Environment in War
UN Secretary General Reiterates the Link between Environment and Security
NATO Report on New Security Threats and Trends
International Conference on Military's Role in Climate Change
UNEP Conference Furthers Environmental Governance
Proposal for a UN Environmental Mediation Program
UN Report on the Role of Natural Resources in Conflict and Peacebuilding
Environmental Security Issues Discussed at the G8 in Japan, July 2008
International Meetings Bring Environment and Security Closer Together
First EU-Central Asia Security Forum Included Environmental Security
ENVSEC to Expand Environmental Co-operation in South Caucasus
France Supports Brazil's Permanent UN Security Council Seat to Promote Environmental Issues
Conference on Future of the Dutch Military Includes Environmental Security as an Emerging Military Role
Somali Piracy is also an Eco-terrorism Threat
The Center for a New American Security Launched National Security Program

INTERNATIONAL TREATIES RELATED TO ENVIRONMNETAL SECURITY AND MILITARY ACTIONS

The Convention on Cluster Munitions Opens for Signature on December 2nd
United States Bans Cluster Munitions Export
Global Zero, a New Initiative for Promoting Global Nuclear Disarmament
Central Asia Becomes Nuclear Weapon-Free Zone

CONFLICT AND POST-CONFLICT ENVIRONMENTAL SECURITY ISSUES

Undersea Abandoned Ordnance Presents Increasing Environmental and Health Hazards
UN to Demand Israel Pay Lebanon Compensations for War Damages
UN to Conduct Post-Conflict Environmental Assessment in Gaza
Iraq Complains of After-conflict Environmental Hazards
Updated Studies on Potential Health Implications of Depleted Uranium
Health Threats from Open Waste Pits in Conflict Zones Trigger Regulation

NATIONAL AND REGIONAL INITIATIVES AFFECTING MILITARY ACTIVITIES

U.S. Policy Shift May Improve International Environmental Security
U.K.'s Military Technology Plan Includes Alternative Energy
NASA-Like Agency to Achieve a 10-Year Environmental Goal Proposed
EU Renewable Energy Policy becomes Legally Binding
European Energy Security Strategies

Norway Proposal to Ban Gasoline-only New Cars by 2015
Canada, Mexico, and the USA Met to Strengthen Regional Environmental Regulations
Uganda to Create an Environmental Police Unit
East African Environmental Projects to Fight Crime and Link Journalists
Japan Sets up e-Waste Collection Locations to Recycle Rare Metals
South Korea Adopts a Green Growth Policy and Influences Next G-20 Meeting
Maldives to Become World's First Carbon Neutral Country in 10 Years

TECHNOLOGICAL BREAKTHROUGHS WITH ENVIRONMENTAL SECURITY IMPLICATIONS
Computer Technology and Robotics
New Detection and Cleanup Techniques
Counter Bioterrorism or Pandemic Technologies
Promising Environmental-friendly Technologies
Space Technology
Technologies that Could Trigger New Forms of Arms Race

B. Preventing or Responding to Environmentally Caused Conflicts

SECURITY IMPLICATIONS OF ENVIRONMNETAL ASPECTS

International Conference on Military's Role in Climate Change
Climate Change Triggers Redrawing Swiss-Italian Borders
Climate Change Impacts Assessment on U.S. National Security
Global Climate Risk Index 2008
UN General Assembly Stressed Environment-related Issues (September 2008)
Future Lithium Dependency Raises New Energy Security Concerns
Global Trends 2025: A Transformed World
Threats and Strategies for Addressing Climate Change in the Middle-East
UNEP Year Book 2009
State of the World 2009
Tools for Addressing Humanity's Growing Ecological Footprint
miniAtlas of Human Security
Improved Governance Needed for Reducing Risks of Environmental Disaster
Arab Mediterranean Governments' Environmental Security Cooperation
Water and Environmental Research Center to Be Established in UAE
New Report Summarizes Pacific Environmental Threats and Solutions
Arctic Debate
Greenland Moving Towards Independence

NATURAL DISASTERS AND SCIENTIFIC EVIDENCS

New 2009 Terminology on Disaster Risk Reduction
Scientific Evidences and Potential Consequences

MIGRATION TRIGGERED BY ENVIRONMENTAL CAUSES

Progress on Defining Environmental Refugees
Environmental Refugees Cyberseminar Revealing Difficulties of Defining Environmental Refugees
Climate Refugees Trends

RISING SEA LEVELS

Scientific Evidences and Potential Consequences

MELTING SEA ICE AND GLACCIERS

Scientific Evidences and Potential Consequences

FOOD AND FRESHWATER

Food and Freshwater Scarcity Issues
Water-related Rights and Security Addressed by 5th World Water Forum
Central Asian Water Security Tensions Continue
Addressing Potential Business-related Water Scarcity Issues
Forums Discussing Water-Related Security Issues

HALTH

Nationwide Health Information Network Could Help in Environmental Emergencies
International Response to Contain Influenza A(H1N1) Outbreak
Global Influenza Pandemic Declared
Climate Change Consequences, Trends, and Actions

ENERGY SECURITY

New International Renewable Energy Agency Opens in January
Energy and Environmental Security Increasingly Addressed Together
An International Energy and Environmental Security Foresight Network
Suggestions for Addressing Energy and National Security
World Energy Outlook 2008

PREVENTION AND ADAPTATION

UN and Governments of Latin America and the Caribbean Met to Improve Disaster Anticipation and Response System
Conference on Resilience Concepts for Large-Scale Disasters
Regional Initiatives

CLIMATE MODELING

Climate Projection Models

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 2008

Aquatic Environment

New International Agreement on Recycling of Ships
Tougher Global Limits Imposed on Air Pollution from Large Ships
UN Convention on the Protection of the Underwater Cultural Heritage will Enter into Force in January 2009
Coral Triangle May Get Regional Protection
World Database on Marine Protected Areas

Chemicals and other Hazardous Compounds

Stockholm Convention on POPs Updated
EU Legislation Banning Mercury Exports in Effect in 2011
EU Updates the REACH System, and WEEE and RoHS Directives
Canada Increases Chemicals Control
India to Enact Regulation Curbing Plastic Bags Use

Forests Management

Rights of Forest Peoples Need to Be Observed in Anti-deforestation Efforts

Waste Management

EU Batteries Directive Entered into Force

PROPOSED TREATIES AND/OR CHANGES TO EXISTING ONES

Aquatic Environment

A New Step Toward Preventing Water Wars
Draft Agreement for Management of International Aquifers
"Roving" Marine Protected Areas as Climate Change Affects Migration
U.S. and Canada to Control Air Emissions from Ships
Measures Needed to Quiet Underwater Noise
Growing Marine Litter Increasingly Threatens Marine Ecosystems

Chemical and Biological Safety

Dangers Increase from "Amateur" Genetic Engineering; the Biological Weapons Convention to be Updated
Research Labs Safety Questioned
New Chemicals Considered for Toxic Lists
New Substances Identified as Harmful to Human Health and the Environment
Canada Extends Toxic Substances Lists
Concerns Increasing for BPA Bans and Phthalates

Greenhouse Gas Emissions
Post-Kyoto Protocol Negotiations
Regulations Might be Needed for New Greenhouse Gases
Aviation and Shipping should be Subject to Emissions Cuts
Aviation to be included in the EU Emissions Trading System from 2012
Airline Group Supports Including Aviation in Global Emissions Trading Scheme
New Zealand Adopts Carbon Trading Scheme in 2009
China Adopting Pollution Tax Systems
New Jersey Ports Pushing for Toxic Diesels Ban

New Technologies
Nanotechnology
Space Technology

Nuclear Safety
Advancements on Non-proliferation and Nuclear Disarmament

Waste Management
European Union to Consider Regulations for Curbing Biowaste

Weapons-related
Increased Efforts Needed to Counter the Proliferation of Weapons of Mass Destruction
Biological Weapons Convention Meeting, August 2008
Support for Total Ban on Nuclear Weapons Increases
Advancements in Setting the Agenda for the 2010 NPT Review

IMPROVED ENFORCEMENT OF ENVIRONMENTAL REGULATIONS
Likelihood of Climate Lawsuits Increasing
UK Could Seize Planes to Enforce European Emissions Trading Scheme
New UN-linked Body Proposed to Protect Biodiversity and Ecosystem Services
Intergovernmental Forum on Chemical Safety becomes part of the International Conference on Chemicals Management
Progress in the Elimination of Chemical Weapons Stockpiles
Ozone Continues to Thin over Antarctica Casting Doubt on Success of the Montreal Protocol
New Air Quality Evaluation Tool
East African Projects to Fight Environmental Crime and Link Journalists
Indonesian Navy to Tighten Security in Sea Border Areas
Vietnam Cracking Down on Environmental Violators

SAFETY ISSUES

Nuclear Safety
IAEA Director Warns on Continuous Nuclear Safety Issues
New Recommendations for Reducing Nuclear Risk
Nuclear Security Addressable only Internationally

International Nuclear Safety Regime Review

Potential Health Threats of Some New Technologies
New Technologies Need New Regulations Systems
The Woodrow Wilson International Center Opens Synthetic Biology Project
Geo-engineering Promises/Threatens Major Consequences
Nanotechnology
Underwater Sounds from Human Sources Endangering Marine Life

POLLUTION
Microplastics Recognized as Environmental Threat to Oceans
Health Hazards from "Environment-friendly" Reusable Bags
Possibly Tainted Imported Drywall Raises Health Fears

OTHER ENVIRONMENT-RELATED PROTECTION MEASURES
Experts Call For Global Network to Prevent Asteroid Disasters
Solar Storm Could Wipe Out Power Grid

NEW INITIATIVES AIMING TO INCREASE ECO-EFFICIENCY
EU-US Joint Energy-Efficiency Standards for Office Equipment
Global Investment Road Map for a Transition to a Greener Economy Launched by UNEP
Green Economy a Solution for Addressing the Global Economic Crises
Global Fuel Economy Initiative Aims to Increase Cars' Fuel Efficiency 50% by 2050

1. ENVIRONMENTAL SECURITY MONTHLY SCANNING ITEMS

A. Preventing or repairing military damage to the environment

ENVIRONMENTAL SECURITY RISES ON THE INTERNATIONAL POLITICAL AGENDA

Environmental Considerations Should be Included in Planning Military Operations

"Green Warriors. Army Environmental Considerations for Contingency Operations from Planning Through Post-Conflict" by RAND Corporation Arroyo Center, is a comprehensive analysis of the environmental aspects in military operations. It shows that considering environmental factors in military actions gives strategic advantages in combat and post-conflict operations, increasing the overall missions' success. Environmental conditions impact troops' health, safety and security and affect diplomatic relations and local populations' and neighboring countries' confidence in the operation. However, the study finds that the Army doesn't have a comprehensive approach to environmental considerations at any phase, or in contracting. The recommendations are: "1. Improve the policy and guidance for environmental considerations in contingency operations. 2. Encourage an environmental ethic throughout the Army that extends to contingency operations. 3. Better incorporate environmental considerations into planning. 4. Improve pre-deployment and field environmental training. 5. Invest more in environmental resources and good environmental practices for field operations. 6. Use a 'sustainability' model for contingency operations." Although specifically analyzing the Army, the results apply to any actors involved in contingency operations. [September 2008; Military Implications, Sources[1]]

International Guidance on the Treatment of Individuals in War May Eventually Guild International Standards on the Treatment of the Environment in War

Making distinctions between civilians and combatants, as well as making distinctions between military targets and civilian areas, is becoming increasingly difficult and may become even more difficult in the future. As a result, the International Committee of the Red Cross has issued an "Interpretive Guidance" concerning "the distinction between legitimate military targets and persons protected against direct attacks." The Guidance is not intended to replace existing rules, but clarify criteria in answering key questions. "Who is considered a civilian for the purposes of the principle of distinction? What conduct amounts to direct participation in hostilities? What modalities govern the loss of protection against direct attack?" With the increasing attention to environmental security, these kinds of questions may eventually be applied to the environment. Although the guidance applies only to IHL affecting human factors, considering the reference that triggered the guidelines, "transformation and modernization of warfare", as well as previous discussions relative to including environmental factors under IHL, it is fair to speculate that the scope and spectrum might be expanded to also cover environmental aspects; e.g., when is the use of environment considered a weapon and when should it be off limits? [June 2009. Military Implications, Sources[2]]

UN Secretary General Reiterates the Link between Environment and Security

On the International Day for Preventing the Exploitation of the Environment in War and Armed Conflict, celebrated on November 6, UN Secretary General Ban Ki-moon renewed the call for "protecting the environment as a pillar of our work for peace." Reiterating that "The environment and natural resources are crucial in consolidating peace within and between war-torn societies," he gave the example of the transboundary cooperation in the Great Lakes Region of Africa to manage their shared natural resources, and underlined that lasting peace in war-torn regions like Darfur and Afghanistan is not possible without restoration of the ecosystem to support livelihoods. He noted that although "The natural environment enjoys protection under Protocol 1 of the Geneva Conventions… this protection is often violated during war and armed conflict." [See also *UN Secretary-General on the International Day for Preventing the Exploitation of the Environment in War and Armed Conflict* in October 2007 environmental security reports] [November 2008; Military Implications, Sources[3]]

NATO Report on New Security Threats and Trends

NATO's report "New Horizons," released ahead of the organization's 60th anniversary summit, addresses the challenges that the organization faces in view of the new threats and trends triggered by current geopolitical developments. Most of the threats and trends have an environment-related root, ranging from structural energy and resource problems that, "may lead to energy/raw material nationalism by anti-Western states," and resource conflicts, to the various direct and indirect consequences of climate change that will lead to "acceleration in the breakdown of ecosystems and more severe 'natural' disasters and food shortages, in turn leading to much higher levels of migration, increased human suffering and greater social unrest". The report quotes a NATO official: "[Climate change] is a global problem requiring the involvement of the UN, NATO, EU and other regional organizations. NATO forces must develop the resiliency to adjust to changing climate and react to its consequences." However, the report emphasizes, "The only aspect of climate change that was considered to be truly affecting the Alliance was resource competition." [March 2009. Military Implications, Sources[4]]

International Conference on Military's Role in Climate Change

The Importance of Military Organizations in Protecting the Climate 2008 conference, attended by over 100 military and environmental experts from 25 countries, plus the EU and UNEP, discussed the security implications of climate change and the role of the military community in addressing it. There was consensus that climate change is a conflict multiplier with global security implications such as: "creating new geopolitical areas of concern; inhibiting the ability to project power; jeopardizing coalition partnerships; increasing operations other than war; overloading UN peacekeeping deployments; and requiring urgent actions by military and civilian leaders and the public"[2]. Therefore military organizations should increase their role in protecting the climate by showing leadership in increasing energy efficiency through procurement and operations, R&D centers of excellence, and transfer of knowledge. Several best practices were discussed and a project was proposed for a global public-private partnership to cooperate in efforts to collect and destroy ozone-depleting substances. Some "visionary military climate

[2] Conference Conclusions and Opportunities for Co-operation. Stephen O. Andersen, EPA Climate Liaison to the US Department of Defense. http://www.igsd.org//conferences/Paris2008/3%20Andersen%20conclusions.pdf

strategies" included "self-sustaining energy at the battlefront; a Carbon Non-Proliferation Treaty; and cooperation on Arctic passage & resources"[3]. The conference, which is the fifth in a series that began in 1991, was held in Paris, November 3-5, co-hosted by the Institute for Governance and Sustainable Development and collaborators. [November 2008. Military Implications, Sources[5]]

UNEP Conference Furthers Environmental Governance

The 25th session of the United Nations Environment Programme (UNEP) Governing Council/Global Ministerial Environment Forum (GC-25/GMEF) took place February 16-20, 2009, at the UN Office in Nairobi, Kenya, with over 1000 participants from 147 countries. The meeting adopted 17 decisions on issues such as hazardous substances, biodiversity, support to Africa, environmental management, and the environmental situation in Gaza.

Strengthening International Environmental Governance. A ministerial consultative process on international environmental governance and global environmental assessment was proposed, and it was decided that UNEP will support governments and stakeholders to improve the scientific basis of their own environmental assessment, management, and effective policy implementation. An "assessment of the assessments" will be submitted to the UNGA 64th session later this year, when universal membership of the Governing Council and a resolution for a more efficient international environmental governance framework will be discussed. UNEP should provide early warning, assessment, and monitoring, provide environmental information supporting policy and decision making, improve implementation and enforcement of MEAs, and address synergies, and support the implementation of the Bali Strategic Plan. The Fourth Programme for Development and Periodic Review of Environmental Law was adopted as a broad strategy for activities related to environmental law for the decade beginning in 2010, with a mid-term review of the implementation and effectiveness of the Programme no later than GC-28 in 2015 and report to GC-30 in 2019. The Secretariat should support the work of drafting guidelines for the development of national legislation regarding, inter alia, access to information and public participation, and liability and redress concerning activities dangerous to the environment. It was also agreed to strengthen the policy relevance of the Global Environment Outlook reports.

Legally Binding Regulation on Mercury to be Drafted by 2013. Agreement was reached for the elaboration of a legally binding instrument on mercury, which could include both binding and voluntary approaches and actions to reduce risks to human health and the environment. It would cover demand, supply, trade, waste, and emissions, as well as finding alternatives. An intergovernmental negotiating committee should be convened in 2010 with the goal of completing its work by 2013, for the GC-27. [EU legislation banning mercury exports will come into effect in 2011.]

Assessment for Cadmium and Lead, and Waste Management. The Governing Council agreed on further assessment of potential health and environmental hazards of lead and cadmium, and that the mandate of the intergovernmental negotiating committee could be supplemented regarding these and/or potential hazardous chemicals. As for waste management, it was decided that UNEP is to provide further assistance to developing countries for implementing an integrated waste management approach, with a progress report to be presented at the GC-26.

[3] Ibid.

Assessment of the environmental situation in the Gaza strip. Expressing concern about the environmental impacts and implications of the conflict in the Gaza Strip, it was decided that a mission of environmental experts be deployed to Gaza to assess the natural and environmental situation, allocate adequate resources and assistance, request UNEP to participate in the Cairo Conference on the Reconstruction of Gaza, and submit a follow-up report on the findings to the GC/GMEF 11th Special Session in 2010. [February 2009. Military Implications, Sources[6]]

Proposal for a UN Environmental Mediation Program

Former and present Executive Directors of UNEP and NGO leaders met June 28-July 2, 2009 in Glion, Switzerland to make recommendations to improve international environmental governance. A UN Environmental Mediation Program (UNEMP) was proposed by U.S. Ambassador John McDonald, Executive Director of the Institute for Multi-Track Diplomacy. The proposed UNEP unit would provide mediation services as requested by governments to help resolve environmental issues between nations and within nations, including training of environmental mediators, establishing national environmental mediation centers, assisting national research programs, and creating an international panel of environmental mediators to be on call to help resolve transboundary disputes. The idea will be considered by UNEP later in 2009. [For an earlier version of the proposal see: "Environmental Security: United Nations Doctrine for Managing Environmental Issues in Military Actions; Appendix C: United Nations Environmental Mediation Program (UNEMP)" at http://www.millennium-project.org/millennium/es-un-app3.html] [June 2009. Military Implications, Sources[7]]

UN Report on the Role of Natural Resources in Conflict and Peacebuilding

The report "From Conflict to Peacebuilding – The Role of Natural Resources and the Environment", co-authored by IISD and UNEP, assesses the linkages among environment, conflict, and peacebuilding. It notes that since 1990 at least 18 violent conflicts have been driven by factors related to natural resources and/or environmental degradation. Over 40% of intra-state wars are linked to the exploitation of natural resources. These situations are twice as likely to return to conflicts or become "re-wars" within the first five years. Unfortunately, fewer than 25% of relevant peace agreements address the environmental or resource aspects. The report analyzes 13 case studies including Afghanistan, Darfur, Sierra Leone, Kosovo, and Gaza. [February 2009. Military Implications, Sources[8]]

Environmental Security Issues Discussed at the G8 in Japan, July 2008

Environmental security issues such as climate change, food crises, energy security and disaster reduction were the focus of the 34th G8 Summit held in Toyako, Hokkaido, July 7–9, 2008. Although the Summit ended without an agreement on firm targets for reducing greenhouse gases, the final declaration stipulates a goal of at least 50% by 2050, with mid-term goals to be adopted by individual countries. This does not meet the suggestion made by the G5 countries (Mexico, Brazil, China, India and South Africa), which also attended the Summit, that developed countries' greenhouse gas reduction targets should be more than 80% by 2050 with an interim target of a 25-40% reduction by 2020. G8 leaders also agreed to implementing ambitious economy-wide mid-term GHG emission reduction goals, using sectoral approaches for achieving national emission objectives, conducting an energy forum to focus on efficiency and new technologies to be held in 2009 in Japan, and establishing the Climate Investment Funds to be

administered by the World Bank to support the efforts of developing countries. [July-August 2008; Military Implications; Sources[9]]

International Meetings Bring Environment and Security Closer Together

The Roundtable on Environment and Security, organized alongside the IUCN Congress, was attended by selected representatives from the security community and major environmental leaders who discussed present and future environmental security issues, explored possibilities for cooperation, examined common strategies, and agreed that the impacts of environmental issues on security are increasingly requiring more attention from governments. Physical conflict and military environmental issues were central to the discussions. The Institute for Environmental Security program "Climate Change and International Security" is organizing several meetings to foster environment-security dialogue and set the agenda for some global environmental agreement(s) to reduce the probability of climate change-related conflicts.

Participants in the IUCN World Conservation Congress pointed out that biodiversity losses are not only more serious than the current financial crises, but are also often irreparable. The IUCN Programme 2009–2012 creates a framework for addressing environmental crises from planning to implementing, monitoring, and evaluating conservation work. Issues that got special attention include: high seas, of which less than 1% are under any kind of protection, nearly all located close to shore; forests—summary of the outcomes of the Forests Dialogue's Initiative on Forests and Climate Change and agreement on five guiding principles for climate change negotiators and tackling deforestation; the role of the environment in avoiding conflict and for post-conflict stability; and better integration of biodiversity concerns into policymaking in all sectors. The new Red List of Threatened Species, unveiled at the Congress, now covers nearly 45,000 species, specifying those that are particularly susceptible to climate change. Over 8,000 people working in conservation or related areas participated in the 10-day IUCN Congress held in Barcelona, Spain, October 5-15, 2008. [October 2009. Military Implications, Sources[10]]

First EU-Central Asia Security Forum Included Environmental Security

The aim of the first EU-Central Asia Security Forum was to consolidate relations between the EU and the Central Asian governments of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan, as envisioned in the EU Strategy for Central Asia. This EU strategy focuses on terrorism, non-proliferation, human and drug trafficking, and energy and environmental security. The EU will help with financing and expertise for curbing illegal traffic of people, arms and drugs, while common energy security issues would be addressed by building infrastructure, including the Nabucco pipeline. The meeting was held in Paris, September 18, and attended by foreign ministers from the Central Asian countries and the EU member states and candidate countries, EU dignitaries, and experts from other organizations. Afghanistan observed. Participants agreed to have "regular exchanges" on these security risks. [September 2008; Military Implications, Sources[11]]

ENVSEC to Expand Environmental Co-operation in South Caucasus

The Environment and Security Initiative (ENVSEC) held a meeting bringing together officials from Armenia, Azerbaijan, and Georgia with representatives from the OSCE, other international organizations, and environmental experts to discuss ways for expanding environment and security cooperation in the South Caucasus region. The ENVSEC helps capacity building to

assess and address environmental threats to security in Southeastern Europe, Eastern Europe, Central Asia, and the South Caucasus. [See also *Environment and Security Program in the East-Caspian Region* in September 2007 environmental security report.] [March 2009. Military Implications, Sources[12]]

France Supports Brazil's Permanent UN Security Council Seat to Promote Environmental Issues

Increasing Brazil's role in international affairs, including a permanent seat on the UN Security Council to provide leadership on environment-related issues, was strongly supported at the second Brazil-EU summit, held in December 2008, by Nicolas Sarkozy, French President and holder of the EU rotating presidency. During the visit, the French and Brazilian leaders also addressed, inter alia, security and military affairs. Meantime, Brazil announced that its new strategic defense plan increases the focus on environmental protection and energy security. [December 2008. Military Implications, Sources[13]]

Conference on Future of the Dutch Military Includes Environmental Security as an Emerging Military Role

The Netherlands Ministry of Defence and the Netherlands Institute of International Relations (Clingendael) held a conference December 15–17, 2008 in The Hague on future roles for the Dutch armed forces. The conference was part of the Future Policy Survey, a comprehensive interdepartmental look at future developments and scenarios to the year 2030 to update the Netherland's defense policies and roles with NATO and the EU. There was some discussion of re-nationalization of defense policy due to ineffectiveness of the EU and NATO. Among the presentations was an overview of future environmental security roles for the military and why these roles will be increasing. [December 2008. Military Implications, Source[14]]

Somali Piracy is also an Eco-terrorism Threat

The rise of piracy in Somalia's waters raised serious environmental and potential eco-terrorism concerns after the hijacking on November 15, 2008 of the large Saudi oil tanker, Sirius Star, reported to contain 2 million barrels of crude oil. While piracy may not present a direct threat to countries' national security, its consequences could have widespread effects. Nevertheless, the integrity of the international efforts to tackle piracy in the region (the UN Security Council resolution, the EU one-year "Atalanta" anti-piracy mission, and international coalition forces patrolling the region) is seriously undermined by allegations that the EU and Asian countries are unwilling or unable to stop companies that have been dumping toxic waste off the Somali coast for many years. The UN special envoy for Somalia, Ahmedou Ould Abdallah, has in the past few months repeatedly warned about illegal fishing and toxic dumping by European firms off Somalia's coast. [See also *Toxic Waste Disposal of Global Growing Concern* in September 2006 and other related items in previous environmental security reports.] [December 2008. Military Implications, Sources[15]]

The Center for a New American Security Launched National Security Program

The Center for a New American Security launched the National Security Program, based on its work on the national security and foreign policy implications of energy and climate change. [June 2009. Military Implications, Sources[16]]

INTERNATIONAL TREATIES RELATED TO ENVIRONMNETAL SECURITY AND MILITARY ACTIONS

The Convention on Cluster Munitions Opens for Signature on December 2nd

The Convention on Cluster Munitions (CCM) will be open for signing at a special conference in Oslo, December 2–4, 2008. The CCM prohibits the use, development, production, stockpiling, and transfer of cluster munitions. It was adopted at the Dublin Diplomatic Conference on Cluster Munitions in May 2008. [See also *International Convention on Cluster Munitions Adopted by 111 Countries* in May 2008 and other related items in previous environmental security reports.] [November 2008. Military Implications, Source[18]]

Convention on Cluster Munitions is Effective

The report Banning Cluster Munitions: Government Policy and Practice assesses the cluster munitions-related situation in 150 countries, including progress on the implementation of the Convention on Cluster Munitions requirements in the signatory or party states. It documents that many countries already started to destroy their stockpiles of the weapon before the treaty formally came into force, and are expected to complete the destruction earlier than the eight-year deadline stipulated by the convention. Spain is the first country that completed the destruction of its cluster munitions stockpiles. Other countries that began the process include: Austria, Belgium, Canada, Colombia, France, Germany, Netherlands, Norway, Switzerland, and the United Kingdom. [June 2009. Military Implications, Sources[19]]

The Cluster Munitions Treaty Signed by 94 Nations

94 nations signed the new international treaty banning cluster munitions at a special conference in Oslo December 3–4, 2008. The agreement will become binding international law six months after 30 signatories have ratified it. Four countries have already ratified it: the Holy See; Ireland; Norway, and Sierra Leone. The treaty forbids states parties to produce, trade, and use cluster munitions, as well as requiring them to discourage other nations from using cluster munitions in joint military operations. Dozens of countries that signed are stockpilers, former producers, and users of the weapon, including 18 of 26 NATO nations, such as the UK, France, and Germany. The number of signatories is expected to increase rapidly. [December 2008. Military Implications, Sources[20]]

United States Bans Cluster Munitions Export

The US adopted legislation banning export from the United States of cluster munitions that leave behind more than 1% of their submunitions as duds, and conditions export on agreement of the receiving country that "cluster munitions will not be used where civilians are known to be present." The law is seen by many as a move of the US closer to the Convention on Cluster Munitions that completely bans these weapons' use, production, and trade. So far, 96 nations

have signed and 5 ratified the Convention; thirty ratifications are required for its entry into force. [March 2009. Military Implications, Sources[21]]

Global Zero, a New Initiative for Promoting Global Nuclear Disarmament

Global Zero is a new effort launched by international leaders—including former heads of state and top diplomatic and defense officials—to eliminate all nuclear weapons worldwide within 25 years. It wants to encourage the international community to establish safeguards and audits for disarmament, using dialogs and strategies different from past approaches. The group plans to organize a global meeting in January 2010, prior to the Nuclear Non-Proliferation Treaty Conference to be held in May 2010. Meantime, the EU also aims to be a leader in nuclear disarmament, suggesting new measures, including a worldwide prohibition on nuclear tests. [See also *Nuclear Safety* in September 2007 and other related items in previous environmental security reports.] [December 2008. Military Implication, Sources[22]]

Central Asia Becomes Nuclear Weapon-Free Zone

With the Kazakh Senate approving the Central Asian Nuclear Weapon-Free Zone treaty, and Kazakhstan President Nursultan Nazarbayev expected to ratify it shortly, Central Asia—including Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan — becomes a nuclear weapons-free zone, with the parties banning the possession as well as stationing of other nations' nuclear weapons on their territories. [See also *Nuclear-Free Zones Continue to Grow* in October 2002 environmental security report.] [December 2008. Military implications, Source[23]]

CONFLICT AND POST-CONFLICT ENVIRONMENTAL SECURITY ISSUES

Undersea Abandoned Ordnance Presents Increasing Environmental and Health Hazards

Leaking abandoned ordnance since WWII or from military excercises is contaminating the waters around Puerto Rico's Vieques Island with carcinogenic materials, endangering the marine ecosystem and the health of inhabitants who eat local seafood, noted University of Georgia ecologist James Porter at the Second International Dialogue on Underwater Munitions held February 25-27 in Honolulu, Hawaii. Other previous findings also show dangerously high levels of heavy metals and other toxic chemicals related to military activities in the area. In 2001, Vieques's residents filed a $100 million damage claim against the US Navy for increased cancer incidence due to military excercises. U.S. Navy efforts to clean up areas of Vieques were so far limited to land and shoreline. Experts note that Vieques Island is one of many marine sites around the world incresingly affected by abandoned ordnance. [See also *CCW Protocol V on Explosive Remnants of War Entered into Force* in November 2006, and other items on this issue in previous environmental security reports.] [February 2009. Military Implications, Sources[24]]

UN to Demand Israel Pay Lebanon Compensations for War Damages

The Lebanese newspaper Al-Akhbar reported that UN Secretary-General Ban Ki-moon will submit a motion to the Security Council requesting Israel to pay Lebanon nearly $1 billion for environmental damages caused during the 2006 Second Lebanon War. The amount is based on a World Bank damage assessment including, inter alia, the cost of UN clean-up of the oil spill after

Israel bombed a large refinery, but not related environmental damages. [See also *Report on Lebanon After-war Environmental Assessment* in February 2007, *Environmental Legacy of Hezbollah-Israeli War* in January 2007, and other related items in previous environmental security reports.] [September 2008; Military Implications, Sources[25]]

UN to Conduct Post-Conflict Environmental Assessment in Gaza

UNEP's Post Conflict and Disaster Management Branch will deploy a team of up to eight experts to the Gaza Strip to assess the environmental impact of the December 2008–January 2009 invasion by Israel. The focus will be infrastructure and contamination risks assessment, wastewater and hazardous wastes management, state of coastal and marine environment examination, and institutional and economic evaluation. The ten-day mission is scheduled for mid-May, with results expected by early June, followed by a report and recommendations in July. [See also *Environmental Legacy of Hezbollah-Israeli War* in January 2007 environmental security report.] [April 2009. Military Implications, Source[26]]

Iraq Complains of After-conflict Environmental Hazards

"It will take centuries to restore the natural environment of Iraq" said Iraqi Environment Minister Nermeen Othman, referring to the environmental catastrophe caused by the conflict: unexploded bombs and 25 million land mines littering the land, hazardous waste and leaking poison of destroyed factories, chemical waste, rubble and trash, obliterated forests to remove the enemy's hiding places, and chemical weapons and depleted uranium munitions that have created 105 contaminated areas. More than 60% of Iraq's fresh water is polluted. Unless serious environmental remedial actions are performed, peace will be difficult even after the war ends. [See also *Iraqi Chemical Attack Victims Seek Compensation from Supplying Companies* in May 2006, *CCW Protocol V on Explosive Remnants of War Entered into Force in November 2006*, and other previous environmental security reports on similar issues.] [October 2008. Military Implications, Source[27]]

Updated Studies on Potential Health Implications of Depleted Uranium

Two recent studies by the Institute of Medicine address the possibility of assessing the potential heath implications of exposure to depleted uranium: Gulf War and Health: Updated Literature Review of Depleted Uranium, and Epidemiologic Studies of Veterans Exposed to Depleted Uranium: Feasibility and Design Issues. Both studies conclude that health impacts of depleted uranium exposure in military and veteran populations are difficult to determine with the available data and procedures and an assessment plan would not be easy to design. However, the study on feasibility and design issues makes some recommendations for improving assessment of depleted uranium-related health outcomes, including "a prospective cohort study if future military operations involve exposure to depleted uranium" and better integration and linkages of DOD databases for identifying health issues of current active-duty military personnel and veterans with potential DU exposure. Both studies are pre-publications by the National Academies Press. [July-August 2008; Military Implications, Sources[28]]

Health Threats from Open Waste Pits in Conflict Zones Trigger Regulation

Over 400 Iraq and Afghanistan veterans complain of health problems after being exposed in conflict areas to burning toxic waste in open pits. A bill introduced to Congress, 'Military Personnel War Zone Toxic Exposure Prevention Act,' requires health assessment of those who were exposed, as well as further prohibition of use of open pits to burn toxic waste. Meantime, several lawsuits have been filed against KBR Inc., a former subsidiary of Halliburton, for liability over soldiers' toxic exposure. [June 2009. Military Implications, Source[29]]

NATIONAL AND REGIONAL INITIATIVES AFFECTING MILITARY ACTIVITIES

U.S. Policy Shift May Improve International Environmental Security

Appointments of environmental scientists to the new U.S. administration, presidential memoranda, and speeches all signal that the new White House will give special attention to environmental matters from energy security to international cooperation for addressing climate change. Some bold actions considered by the new U.S. administration in its first week in office, include:

- implement the Energy Independence and Security Act that requires increasing car fuel efficiency standards starting with model year 2011 for reaching at least 35 miles per gallon by 2020 for cars and light trucks
- instruct the Environmental Protection Agency to allow California and other States willing to adopt stricter emissions standards for new motor vehicles (California's law requires reducing vehicles' emissions by 30% by 2016; so far, 13 other states and the District of Columbia want to follow California's standards, representing about 40% of the U.S. car market)
- double capacity for alternative sources of energy like wind, solar, and biofuels over the next 3 years
- build a smart electricity super-grid to transport renewable energy from the West to the rest of the country
- allocate funds for weatherizing public and private buildings, and appoint a special envoy for climate change. There are also signals for tougher environmental standards, the adoption of a cap-and-trade system for CO_2 emissions, and America's participation in the international efforts to negotiate a post-Kyoto Protocol on climate change
- appoint a climate change special envoy (Todd Stern) for international negotiation of actions and accords to address climate change causes and effects

[January 2009. Military Implications, Sources[30]]

U.K.'s Military Technology Plan Includes Alternative Energy

The Defence Technology Plan of the British Ministry of Defence outlines the British military's long-term research objectives to help defence contractors set R&D priorities. It highlights five "capability visions," including reducing dependency on fossil fuels by introducing new alternatives. [March 2009. Military Implications, Sources[31]]

NASA-Like Agency to Achieve a 10-Year Environmental Goal Proposed

An international expert meeting on worst-case scenarios for global warming held at the Foundation for the Future near Seattle, Washington, proposed the creation of a NASA-like U.S. agency to achieve a 10-year environmental goal. A lobby, independent from the foundation, is being created, composed of environmental leaders, aerospace engineers, and business executives (working title is the American Climate Alliance) to get the US Congress to create the agency by 2010 that would reach the goal by 2020. [September 2008; Military Implications, Sources[32]]

EU Renewable Energy Policy becomes Legally Binding

The targets set by the EU 20/20/20 energy policy become legally binding for all member States by 2020. They are to cut greenhouse gas emissions by 20%, establish a 20% share for renewable energy, and improve energy efficiency by 20%. EU member states have to present their national action plans by June 2010, and report on progress every two years. [See also *EU Leaders Support the 20/20/20 Energy Plan* in March 2008 and other related items in previous environmental security reports.] [October 2008. Military Implications, Sources[33]]

European Climate and Energy Package Formally Adopted

The European 20/20/20 energy and climate package was formally adopted, setting legally binding targets requiring that by 2020 greenhouse gas emissions be cut to 20% below 1990 levels, the share of renewable energy increase to 20%, and energy efficiency improve by 20%. The package consists of six legislative acts and will enter into force 20 days after publication in the Official Journal, expected in May 2009. [April 2009. Military Implications, Sources[34]]

European Energy Security Strategies

The recent natural gas crises caused by the Russia/Ukraine clash prompted Europe to address energy security more aggressively. The European Commission proposed a €3.5 billion (approx. $4.5 billion) program for new gas pipelines and electricity networks and offshore wind projects; earmarked €250 million (approx. $320 million) for the politically controversial Nabucco project (the outstanding balance to the estimated €8 billion (approx. $10.25 billion) to be covered by member states and private companies); and Germany is promoting the Nord Stream pipeline project. Europeans might also emulate the U.S. super-grid scheme to carry solar energy from the Sahara, geothermal energy from Iceland, hydropower from Scandinavia, and wind power from the North Sea. [See also *EU Renewable Energy Policy becomes Legally Binding* in December 2008 and other related items in previous environmental security reports.] [January 2009. Military Implications, Sources[35]]

Norway Proposal to Ban Gasoline-only New Cars by 2015

Norway Finance Minister Kristin Halvorsen wants to put forward a proposal to ban from 2015 the sale in Norway of new cars that run solely on fossil fuels. The proposal's intent is to force carmakers to shift to greener models, to help cut greenhouse gas emissions. [See also *European Commission Proposed Binding Legislation for Vehicle Emissions Cuts* in December 2007 and *All-Electric cars coming from Norway and China with More than Hundred Mile Ranges* in April 2008 environmental security reports.] [April 2009. Military Implications, Source[36]]

Canada, Mexico, and the USA Met to Strengthen Regional Environmental Regulations

Environment ministers of Canada, Mexico, and the United States met as the Council of the Commission for Environmental Cooperation (CEC) and consulted with the Joint Public Advisory Committee in Denver this month to improve public participation and partnerships, enhance accountability and transparency, and set clear performance goals concerning environmental regulations across the continent. The environmental trilateral 2010–2015 Strategic Plan will consider strategies for reducing CO2 emissions (including a potential continental cap-and-trade system), climate change mitigation and adaptation issues, and enhancing protection of ecosystems. The participants from the public group asked specifically that reducing the North American ecological footprint also be included. Earlier this month, U.S. Secretary of State Hillary Clinton and Canada's Minister of Foreign Affairs Lawrence Cannon met and announced their intention to modernize the 37-year-old Great Lakes Water Quality Agreement to reflect the new environmental threats and technologies to address them. [June 2009. Military Implications, Sources[37]]

Uganda to Create an Environmental Police Unit

The Uganda National Environment Management Authority announced that it will form a police unit to "address environmental crimes, investigations and prosecution." The unit is expected to be operational in the next financial year. The Nature and Extent of Environmental Crime in Uganda report lists as leading environmental degradation causes: illegal waste disposal, pollution, and dumping and encroachment on protected areas. [October 2008. Military Implications, Sources[38]]

East African Environmental Projects to Fight Crime and Link Journalists

The Environmental Crime Project launched jointly by the Institute for Security Studies and Eastern Africa Police Chiefs Cooperation Organization has the mandate to develop mechanisms to improve environmental law enforcement and policy making in the East African region. The project will operate in Uganda, Kenya, Tanzania, Burundi, Rwanda, Seychelles, Ethiopia and Sudan, increasing protection against all forms of environmental crimes.
The new Network of Climate Journalists in the Greater Horn of Africa (NECJOGHA, www.necjogha.org) represents an interactive resource for environment-related information and communication in the region. The network is the result of collaboration among many international and national environment organizations, universities, and climate centers. [July-August 2008. Military Implications, Sources[39]]

Japan Sets up e-Waste Collection Locations to Recycle Rare Metals

Odate city in northern Akita Prefecture, Japan has set up collection boxes for people to get rid of old cell phones, hair driers, and other electronic devices to recover rare metals. The demand for rare metals is increasing with the growth of high tech products. Hence, availability and future cost of indispensable rare metals is of increasing concern. This collection of e-waste and recycling is spreading throughout Japan with the help of subsidies from the Environment Ministry. [December 2008. Military Implications, Source[40]]

South Korea Adopts a Green Growth Policy and Influences Next G-20 Meeting

President Lee Myung-bak stressed "Green Growth" at the Global Korea 2009 forum in Seoul as a way to address both the global financial crises and climate change at the same time. He will be a member of the G-20 management Troika for the April 2009 G-20 meeting in London along with leaders of Brazil and the U.K, and is expected to push the Green Growth strategy. [February 2009. Military Implications, Sources[41]]

Maldives to Become World's First Carbon Neutral Country in 10 Years

The Maldives, one of the countries most affected by climate change, has become the seventh country of the UNEP-led Climate Neutral Network (CN Net), announcing that in 10 years it wants to become the world's first carbon neutral country by fully switching to renewable sources of energy. [May 2009. Military Implications, Source[42]]

TECHNOLOGICAL BREAKTHROUGHS WITH ENVIRONMENTAL SECURITY IMPLICATIONS

Computer Technology and Robotics

Proceedings of the Conference on Wearable Electronics
Robot "Fish" Evaluate Underwater Pollution
Autonomous Robots May Need Environmental Concerns
Wearable Computing Show Scheduled in Milan 20 May 2009
Environmental Early Warning Systems with Web Crawlers

Proceedings of the Conference on Wearable Electronics

An insight into the current state of the field of wearable computing is available in the proceedings of the Fifth International Forum on Applied Wearable Computing, part of the ISWC 2008—12th IEEE International Symposium on Wearable Computing, held September 28–October 1, 2008 in Pittsburgh PA. [October 2008. Military Implications, Source[44]]

Robot "Fish" Evaluate Underwater Pollution

BMT Group, of Teddington, England, announced plans for initial testing of a new device for sensing underwater pollution. The device, developed by Prof. Huosheng Hu and associates at the School of Computer Science and Electronic Engineering, University of Essex, is physically modeled on a fish, is autonomous, requiring no external control, and communicates findings from its chemical sensors via a Wi-Fi connection at a charging point. [March 2009. Military Implications, Sources[45]]

Autonomous Robots May Need Environmental Concerns

Current work on intelligent battlefield robots by Ronald C. Arkin at Georgia Tech is focused on building into their programming regard for such elements as rules of engagement and the Geneva Convention. [November 2008. Military Implications, Source[46]]

Wearable Computing Show Scheduled in Milan 20 May 2009

The Road Show wearIT@work: The Present and the Future of Wearable Computing - Application in real-life work environments will take place on 20 May 2009 at the HP Milano site in Cernusco sul Naviglio, Milan, Italy. wearIT@work is an Integrated EU FP6 Project and is the largest project worldwide in Wearable Computing. Its major goal is the development and integration of wearable computing as a way of bringing computer support to workers without interfering with their normal activities. [April 2009. Military Implications, Sources[47]]

Environmental Early Warning Systems with Web Crawlers

Web crawlers ("software programs that browse the World Wide Web in a methodical, automated manner") could serve as part of an early warning system for changes that may indicate impending ecological/environmental problems, points out an article by researchers from the Stockholm Resilience Centre at Stockholm University and the University of East Anglia. They suggest, "web crawlers can collect information on the drivers of ecosystem change, rather than the resultant ecological response,…. future early warning systems can make use of the recent insight that shows that ecosystems sometimes 'signal' a pending collapse, … [and the crawlers] may find information that describes ecological changes at small scales, which may warn of similar shifts in other locations" [March 2009. Military Implications, Sources[48]]

New Detection and Cleanup Techniques

New Substrate Preparations Make for Inexpensive "Labs on a Chip"
Miniature Radiation Sensors Could Implement Detection Network
New Air Quality Evaluation Tool
Single-walled Carbon Nanotubes Give Support to Antimicrobial Enzyme
Nanotube-based Coating Repels Water to Achieve Self-cleaning Surface
Chemical Probe Offers Fast Detection of Ricin
Single-electron Transistors (SETs) and NEMS Make for New High-performance Sensor
New Studies of Bacterial Oil Degradation in Contaminated Soil
Fluorescent Sensor Bacteria Offer Fast Pollutant Detection
New Bacterium Can Provide Arsenic Cleanup and Possibly Detection
Soil Bacterium May Convert Toxic Metals to Harmless Form
Fast Multi-hazard Water Analyzer
Improved Technique for Removing Heavy Metals from Water
Reusable Hydrogels Detect and Remove Heavy Metals from Contaminated Water
Improved Techniques for Water Treatment
New Membrane for Energy-efficient Water Filtration
Water Filter Effective Against Parasites
Inverse Fluidization of Aerogels Removes Oil from Water
Simple New Technique Supplies Chlorine for Water Purification
Carbon Nanotube Adsorbents Remove Water Impurities
New Techniques for Multi-nanowire Detection Arrays
New Deep Water Marine Sensors Being Developed
Energy-saving Communications for Underwater Environmental Sensing Networks
New Treatment Improves Congo Red Decontamination

Variable Heating Provides New Flexibility for Gas Sensors
Isotope Ratio Evaluates Decontamination Success
New Material Stores Methane in Dry Form
Nano-engineered Gold Surface Mercury Vapor Sensor
Manure Aids in Removing Hydrogen Sulfide from Biogas

New Substrate Preparations Make for Inexpensive "Labs on a Chip"

Professor George Whitesides and colleagues of the Dept. of Chemistry at Harvard University have developed an inexpensive way of turning a sheet of paper into a microfluidic "lab on a chip" medium for bioassays. The technique is based on soaking the sheet with a hardenable photoresist, covering it with a transparency containing a drawing of the desired pattern of channels, and exposing it to light, rendering it impenetrable except in those areas shielded by the drawing. An analogous scheme is used by Aaron Wheeler of the University of Toronto to inexpensively make copper molds for plastic microfluidic chips. In his method, a pattern is inked directly onto a sheet of copper before a chemical is used to etch away a thin layer from exposed areas, leaving behind the mold pattern for the network of channels. [October 2008. Military Implications, Sources[50]]

Miniature Radiation Sensors Could Implement Detection Network

Scientists at Purdue University are working on developing a miniaturized radiation detection device that is small enough to fit into a mobile phone. Their suggestion is that a population carrying such embedded devices, together with software and communications subsystems, could serve as a networked system for the detection of radiological hazards such as "dirty bombs". [October 2008. Military Implications, Sources[51]]

New Air Quality Evaluation Tool

According to a news story in Science Daily "The Grupo de Modelos y Software para el medio Ambiente of the Facultad de Informática at the Universidad Politécnica de Madrid has developed a very sophisticated tool (OPANA) that estimates the impact of air quality on the health of citizens using last generation models. … [It produces] extremely precise measurements of the concentration of a certain atmospheric contaminant that a person breathes in a determined time and place, from a particular source (an industry, an incinerator, a motorway, etc.). It is possible to determine the consequent impact under almost any circumstances or distance from the source." The results require the input of accurate data on local topography and land use, meteorology, and, most importantly, the estimated emissions in the area. [March 2009. Military Implications, Sources[52]]

Single-walled Carbon Nanotubes Give Support to Antimicrobial Enzyme

A team of researchers from the Samuel Ginn College of Engineering at Auburn University produced antimicrobial coatings that have the potential to prevent diseases from spreading on contaminated surfaces. They mixed a lysozome solution with physically strengthening single-walled carbon nanotubes, and used layer-by-layer deposition to produce an inherently antimicrobial surface. [July-August 2008. Military Implications, Sources[53]]

Nanotube-based Coating Repels Water to Achieve Self-cleaning Surface

A research team led by Ayyappanpillai Ajayaghosh at the National Institute for Interdisciplinary Science and Technology in Trivandrum, India, developed a coating that produces surfaces so hydrophobic that a 2° slope causes water droplets to run off them, taking dust and other contaminants with them. The treatment is a dispersion of carbon nanotubes that coated with para-ethylene vinylene, a highly hydrophobic molecule. [July-August 2008; Military Implications, Source[54]]

Chemical Probe Offers Fast Detection of Ricin

A team of the Dept. of Chemistry and Biochemistry at the University of California at San Diego developed a fast-acting (30 minute) test for the presence of ricin-caused cell damage, based on inserting into RNA a synthetic nucleoside that glows under UV, when it is damaged by ricin. Previous tests, which detect the ricin protein itself, require 48 hours. The researchers anticipate that the technique can be implemented in a chip for use in the field. [July-August 2008; Military Implications, Source[55]]

Single-electron Transistors (SETs) and NEMS Make for New High-performance Sensor

A team at the School of Electronics and Computer Science at the University of Southampton, England, part of the EU FP-7 NEMSIC project, is developing an extremely small, high-performance, low-power sensor in silicon which will have applications in biosensing and environmental monitoring. The device co-integrates single-electron transistors (SETs) and nano-electro-mechanical systems (NEMS) on a common silicon technology platform to produce the smallest sensor offered so far. [July-August 2008; Military Implications, Source[56]]

New Studies of Bacterial Oil Degradation in Contaminated Soil

Two papers in the recent issue of the African Journal of Biotechnology report on studies, one in Nigeria and one in Kwazulu-Natal, of bacterial degradation of oil in contaminated soil. The latter research found five indigenous bacteria that degraded diesel by more than 85% within two weeks. [July-August 2008; Military Implications, Source[57]]

Fluorescent Sensor Bacteria Offer Fast Pollutant Detection

Jan Van der Meer, an environmental microbiologist at the University of Lausanne, Switzerland, and his team have announced successful results in their testing of sensor bacteria that release an enzyme in response to a given chemical and that have been genetically engineered so that that release also produces a protein that fluoresces in a particular color. Trials were conducted by testing ocean water for pollution from a simulated oil spill. Results could be obtained in a matter of minutes, as compared to the weeks needed for conventional chemical analysis. The bacteria's self-reproduction eases the task of supplying test material. [September 2008; Military Implications, Source[58]]

New Bacterium Can Provide Arsenic Cleanup and Possibly Detection

Thomas Osborne and Joanne Santini from University College, London presented a paper at the Society for General Microbiology's autumn meeting announcing the discovery, at Yellowknife

NWT, Canada, of a bacterium which converts arsenic in water from arsenite to much more easily removable arsenate, even at very low temperatures. The researchers also hope that an enzyme enabling the development of an arsenic biosensor can be isolated from these new strains of bacteria. [See also *Arsenic-polluted Water Decontamination Using Sulphate* in November 2004 and *Transgenic Plants to Decontaminate the Environment (removes arsenic from contaminated soil)* in the October 2002 environmental security monthly reports.] [September 2008; Military Implications, Sources[59]]

Soil Bacterium May Convert Toxic Metals to Harmless Form

An international group of scientists at the Ohio State University, Columbus have published an on-line paper describing how the bacterium Shewanella oneidensis, found in soil, including nuclear waste dumps, breaks down metal oxides to chemically extract oxygen, leaving behind a non-soluble, and therefore harmless, residue. [March 2009. Military implications, Sources[60]]

Fast Multi-hazard Water Analyzer

A new automatic Biohazard Water Analyzer directly measures individual species of pathogenic bacteria, protozoa and viruses in the same test, and provides reports in two to three hours time. The technology is RNA-based, developed by Early Warning, Inc. of Troy NY and is licensed from NASA's Ames Research Center. [April 2009. Military Implications, Sources[61]]

Improved Technique for Removing Heavy Metals from Water

Scientists of the Research Center for Eco-Environmental Sciences of the State Key Laboratory of Environmental Chemistry and Ecotoxicology, Chinese Academy of Sciences in Beijing, developed an improved technique for removing heavy metals from water. Fe3O4 magnetic nanoparticles coated with humic acid are added to the water; they adsorb heavy metals, and are then removed with magnets. Their innovation is the use of the humic acid coating to prevent the particles from aggregating or oxidizing, while the acid itself combines with heavy metal ions. [July-August 2008; Military Implications, Source[62]]

Reusable Hydrogels Detect and Remove Heavy Metals from Contaminated Water

Scientists at the Department of Chemistry, University of California at Berkeley developed a group of low cost protein-cross-linked hydrogels, incorporating pea metallothioneins, for the detection and sequestration of heavy metal ions, such as cadmium, in contaminated water. The compounds shrink upon absorbing metals, providing a detection capability, and can be reused after the bound metal ions are removed by chelation. The researchers are also working on applying the same technique to other types of pollutants. [December 2008. Military Implications, Source[63]]

Improved Techniques for Water Treatment

According to an NSF announcement, the Center of Advanced Materials for Purification of Water with Systems at the University of Illinois Urbana-Champaign is developing "sensors with specially designed and synthesized DNA to detect trace amounts of lead, mercury, arsenic and other contaminants" and "chemically activated fibers and granules of carbon for removal of

heavy metals and pesticides like atrazine in the presence of natural organic matter that interferes with many existing sensors". [February 2009. Military Implications, Source[64]]

New Membrane for Energy-efficient Water Filtration

IBM Research (San Jose CA), Central Glass Co., Ltd. (Tokyo), the King Abdul Aziz City for Science and Technology (Riyadh), and the Univ. of Texas at Austin announced development of a new material for the energy-efficient membrane technology for water purification. The new formulation exhibits resistance to chlorine damage and performs well in mildly basic conditions, making it suitable for arsenic removal as well as water desalination. [March 2009. Military Implications, Source[65]]

Water Filter Effective Against Parasites

A new sand filter reportedly has the ability to clean water 30 to 50 times faster than similar existing devices, with the added advantage that it is effective in removing oocysts of the Cryptosporidium protozoan parasite from the flow. The filter, being developed by Prof. James Amburgey of the Department of Civil and Environmental Engineering at the University of North Carolina at Charlotte, uses a chemical pretreatment scheme based on ferric chloride and a pH buffer that is added to the water; a single formulation of the chemicals in the scheme seems to be effective regardless of water quality. [April 2009. Military Implications, Source[66]]

Inverse Fluidization of Aerogels Removes Oil from Water

Scientists from the Otto H. York Department of Chemical Engineering at the New Jersey Institute of Technology, Newark, have reported a very efficient water decontamination technique in which a floating bed of surface-treated hydrophobic aerogel (Nanogel) granules are fluidized by a downward flow of oil-contaminated water in an inverse fluidization mode. According to an abstract, "Among the advantages of the process is the extremely low energy consumption (low pressure drop) during oil removal and the large absorption capacity. Oil concentrations of about 2000 mg/L in water could be reduced to less than 10 mg/L by the inverse fluidization process." [February 2009. Military Implications, Source[67]]

Simple New Technique Supplies Chlorine for Water Purification

John Hays, superintendent of Washington, Iowa's water treatment plant, developed an electrolytic chlorination technique that offers an easy, inexpensive way of creating potable water in primitive circumstances. The method involves passing salt water through an electrolytic device (driven by, say, a 12 v. battery), to produce a combination of ozone, hydrogen peroxide, and chlorine, which can then be used for water purification. The method is being offered commercially by International Water Management Systems of Washington IA. [February 2009. Military Implications, Sources[68]]

Carbon Nanotube Adsorbents Remove Water Impurities

Prof. S. Ramaprabhu of the Alternative Energy and Nanotechnology Laboratory and Department of Physics at the Indian Institute of Technology, Madras, has led research resulting in the filing of a patent application for a nanocomposite adsorbent that could treat polluted wastewater from

industrial plants and other sources, eliminating viruses, bacteria, toxic metal ions, and other organic molecules, although possibly requiring some modification for certain purposes. The news story reporting this also mentions water treatment research by Catalyx, Inc. of Anaheim CA, using reverse osmosis, and a project at the Center for Green Science at Carnegie Mellon Univ., based on tetra-amido macrocyclic ligand catalysts. [March 2009. Military Implications, Sources[69]]

New Techniques for Multi-nanowire Detection Arrays

A team from the Electrical Engineering Department at Pennsylvania State University has developed an improved, potential mass production technique for assembling detector nanowires into an array on a silicon chip, using an electric field. Once in place, with electrodes on top of them, the set of treated wires yields a portable and very sensitive detector for multiple toxins or pathogens. A nanowire detectably changes its conductivity when a target substance (say, a toxin) binds to the specific complementary coating on the wire. Harvard chemist Charles Lieber earlier devised a competing technique to line up nanowires using polymer bubbles, and Prof. Mark Reed at Yale attacked the problem using an etching process. [January 2009. Military Implications, Sources[70]]

New Deep Water Marine Sensors Being Developed

Prof. Hywel Morgan from the UK's University of Southampton's School of Electronics and Computer Science and Dr. Matt Mowlem at the National Oceanography Centre, Southampton, have performed initial testing of new technology marine sensors that are "capable of measuring harsh environments [and] can be deployed for months at a time", according to a University announcement. The four-year project's two goals are said to be "to develop lab-on-a-chip chemical and biochemical analyzers to detect nutrients and pollutants at the ultra-low concentrations found in the ocean, and to develop small chips to identify individual phytoplankton in the oceans". The researchers foresee applications wherever the condition of environmental water needs to be assessed. [January 2009. Military Implications, Source[71]]

Energy-saving Communications for Underwater Environmental Sensing Networks

A low-cost, low-power modem subsystem for short-range, low data-rate underwater networking is being developed by a team of computer scientists from the University of California at San Diego's Jacobs School of Engineering. The technology is based on reconfigurable hardware, and will enable the construction of low-cost, more efficient, underwater sensor networks that can capture and transmit environmental data back to land in real time. [May 2009. Military Implications, Source[72]]

New Treatment Improves Congo Red Decontamination

K.P. Gopinath of the Dept. of Chemical Engineering, A.C. College of Technology, Anna University, Chennai, India, and colleagues reportedly have developed an improved technique for the degradation of the toxic pollutant Congo Red. The method uses sonolysis as pretreatment followed by biological treatment with Bacillus sp. Sonolysis is the breaking of chemical bonds with sound. [September 2008; Military Implications, Sources[73]]

Variable Heating Provides New Flexibility for Gas Sensors

Researchers Barani Raman and associates at the US National Institute of Standards and Technology (NIST) have developed a new "sensitive detector technology capable of distinguishing hundreds of different chemical compounds with a pattern-recognition module that mimics the way animals recognize odors", according to a NIST announcement. The current unit comprises eight types of sensors in the form of oxide films deposited on the surfaces of 16 microheaters that allow the sensors to be heated to 350 temperature points between 150°C and 500°C, and "relies on changes in electrical conductance in the sensing film to detect the presence of adsorbed gases. Temperature changes may be used to create response 'fingerprints' for different gases." The new technology is better than previous devices at recognizing previously un-sensed compounds and at dealing with sensor wear over time. [November 2004. Military Implications, Source[74]]

Isotope Ratio Evaluates Decontamination Success

A recent EPA report describes a new method for monitoring the success of biodegradation in decontaminating underground water. The technique, developed at the Univ. of Toronto's Stable Isotope Laboratory, depends on the active microbes' preference in the cleansing process for the carbon-12 isotope over carbon-13. The resulting change in the ratio of these isotopes in the contaminant indicates that the decontamination is proceeding satisfactorily. [February 2009. Military Implications, Sources[75]]

New Material Stores Methane in Dry Form

An inexpensive dry material that will absorb large quantities of methane is being developed by Prof. Andy Cooper, Director of the Centre for Materials Discovery at the University of Liverpool's Department of Chemistry. The technique is to form methane hydrate by mixing water droplets with a special form of silica that stops them from coalescing, forming a 'dry water' powder that absorbs large quantities of methane rapidly at around 0° C. [November 2008. Military implications, Source[76]]

Nano-engineered Gold Surface Mercury Vapor Sensor

Professor Suresh Bhargava and a research team from the Industrial Chemistry Group at RMIT Univ., Melbourne, Australia, have developed a greatly improved sensor for mercury vapor, using a nano-engineered gold surface as the mercury-attracting element, producing a device which is less susceptible to interference from organic compounds, ammonia, and water vapor. The modified surface is 180% more sensitive than a non-engineered one. [May 2009. Military Implications, Source[77]]

Manure Aids in Removing Hydrogen Sulfide from Biogas

SulfaMaster is a product combining manure and other ingredients to produce a filtering material that removes hydrogen sulfide, an acid rain- and corrosion-causing component, from biogas, a renewable energy source derived from the breakdown of animal waste. It is especially suitable for small biogas-producing operations that cannot afford large scrubbers. The developers are Gary Harman, professor of plant biology at the New York State Agricultural Experiment Station

in Geneva, and Terry Spittler, a retired analytical chemist at Cornell. [January 2009. Military Implication, Source[78]]

Counter Bioterrorism or Pandemic Technologies

New Nanotube-based Design Yields More Sensitive Pathogen Detector

Hiroshi Matsui, professor of bionanotechnology at Hunter College in New York, and collaborators from the Nanobiosensors and Molecular Nanobiophysics Group at the Research Center on Nanoscience and Nanotechnology at Universitat Autònoma de Barcelona in Spain, developed a new design for lab-on-a-chip pathogen (e.g., bacteria and viruses) detection devices, using an AC-driven peptide nanotube capacitance probe to increase sensitivity of the element. It appears that the design can be scaled up to provide multiple-threat detection in a single device, although there are challenging problems with registration of a number of electrodes. [December 2008. Military Implications, Source[79]]

Chemical Weapons-Resistant Chameleon Fabric to be Developed

Scientists at the Sandia National Laboratories in New Mexico are working on research that could lead to developing synthetic materials that would react to surrounding conditions—change color and temperature, and even "seal" upon contact with a hazardous chemical agent. Now that the theory is understood, they hope to get material results (mainly using nanotechnology) in five to ten years. "The long-term goal and payoff has a number of different applications, both in civilian applications as well as military ones," said principal investigator George Bachand. [April 2009. Military Implications, Sources[80]]

Faster and Cheaper Virus Detector Uses Indium Nanowires, Synthetic Antibodies

A more rapid and cheaper type of SARS virus-detector is being developed by a team from the University of Southern California. The active elements are indium oxide nanowires carrying bioengineered synthetic antibodies, reportedly resulting in a system which is lower in cost and produces results in minutes rather than hours, compared to existing devices. [June 2009. Military Implications, Source[81]]

Promising Environmental-friendly Technologies

New Process Improves Water Desalination Efficiency
Biodegradation of Carbon Nanotubes Could Mitigate Potential Toxic Effects
New Material Makes Biodegradable Plastic Bags
Proposed Uniform Device-Charging Scheme Could Yield Environmental Benefits
New Scheme for Wireless Sensor Networks Improves Many Metrics
New Protection for Plastic Electronics
New Technique May Solve Wind Farm Interference with Radars
Environmentally Polluting Ash Turned into Concrete-like Structural Material
Another "Green" Concrete Announced
Integrated Monitoring/Control System Aids Buildings' Environmental Performance
Fiber Check Dams with Chemicals Control Polluting Construction Runoff

Technologies for New Generation of Cars

Largest Chinese Car Maker Produces All-electric Model
Compressed Air Car May Offer Environmental Advantages
New Catalysts Improve Hydrogen Generation Processes for Energy Storage
New Materials Provide Hope for Improved Ultra-capacitor
New Materials Provide Improved Ultracapacitor Storage
New Palladium-Platinum Catalyst Structure Increases Fuel Cell Efficiency
Ion Jelly Electrolyte Offers Environmental Advantages
Carbon Nanotubes Could Replace Expensive Platinum Catalysts in Fuel Cells
New Materials Better for Separating Hydrogen from Other Gases
Electrostatic Capacitors Offer Energy Storage Improvement
New Lithium-Ion Material Improves Recharging Time
Lithium-sulphur Battery Problem Solved by Nanotechnology
New Fuel Cell Membrane May Solve Dry Surroundings Problem
Environmental Advantages in New Methanol Production Process

Increasing Energy Efficiency Technologies

Study of Cost and Availability of Possible New Solar Cell Materials
Nanoparticles Increase Solar Cell Light-gathering Efficiency by 30%
Diatoms Help Build Better Dye-sensitized Solar Cells
Genetically Engineered Viruses Produce Advanced Battery Electrodes
First Flexible Supercapacitor Built
Mobile Unit Turns Waste into Energy
Titanium Nanotube Catalyst A Step Forward in CO2 to Methane Conversion
Light Emitting Diodes Offer Big Environmental Advantages
Small Omnidirectional Wind Turbines Could Provide Remote Power
New Technique Provides Cheaper LEDs
Photoelectric Energy Efficiency Increase by Photosynthesis-type Semiconductor Structure

Promising Environmental-friendly Technologies

New Process Improves Water Desalination Efficiency

Yale University researchers have developed a new energy-saving forward osmosis technique for water purification. The method, which is claimed to require only 10% as much power as previous ones, uses a new formulation for the "draw solution" in the osmosis process. Oasys Water, Inc. has been formed to exploit the discovery. [January 2009. Military Implications, Sources[83]]

Biodegradation of Carbon Nanotubes Could Mitigate Potential Toxic Effects

Work done by Dr. Alexander Star, Dr. Valerian Kagan, and colleagues, at the Univ. of Pittsburgh, and reported in Nanowerk, has shown that carbon nanotubes, which can have negative biological effects, can be destroyed by natural biodegradation through enzymatic

catalysis, using horseradish peroxidase and hydrogen peroxide over a period of several weeks. This technique is milder and more natural than the previous method, which involved a harsh solvent consisting of sulfuric acid and high concentrations of hydrogen peroxide. [November 2008. Military Implications, Source[84]]

New Material Makes Biodegradable Plastic Bags

A research group led by Truong Phuoc Nghia at the Ho Chi Minh City University of Sciences has developed a nanocomposite plastic bag material that is less expensive than others, made from renewable sources, and is biodegradable in landfills. Its application may be somewhat limited by the facts that the resultant bags are reusable only if they do not come in contact with water, and that they rely on bacterial degradation for their low environmental impact. [January 2009. Military Implications, Source[85]]

Proposed Uniform Device-Charging Scheme Could Yield Environmental Benefits

Green Plug of San Ramon California seeks adoption of its environment-friendly charging technology for battery-operated devices. The technique depends on a "smart" universal plug-in-the-wall charger that communicates with a proprietary chip in the attached user device to determine what voltage level to provide to it for recharging. Adoption of this hardware (which would use a single connector configuration) would allow a single multiple-outlet charger to service all portable devices at a given location. In addition to eliminating the proliferation of discarded obsolete chargers into electronic waste dumps, the technology, unlike conventional transformer-type chargers, also uses almost zero power when not actually supplying current. [November 2008. Military Implications, Sources[86]]

New Scheme for Wireless Sensor Networks Improves Many Metrics

Los Alamos National Laboratory computer scientist Sami Ayyorgun developed a new communications scheme for wireless sensor networks that improves a number of network performance measures, e.g., connectivity, energy, delay, throughput, system longevity, coverage, and security. The technique depends on each node's using a dynamically variable transmitting power, chosen according to an algorithm described in the paper. [July-August 2008. Military Implications, Sources[87]]

New Protection for Plastic Electronics

Researchers at the University of Texas at Dallas have developed a new form of self-healing for the metal oxide thin film layers that protect the plastic covering for a wide variety of electronic devices, e.g., displays, low-cost solar cells, and chemical- and pressure-sensitive sensors. These layers are subject to damage from moisture and flexing. The technique uses a nanocomposite material that combines a water-degradable polymer and a titanium tetrachloride healing agent, which act together to seal minute defects in the protective layer. [December 2008. Military Implications, Source[88]]

New Technique May Solve Wind Farm Interference with Radars

Cambridge Consultants Ltd. of Cambridge UK and Boston MA is working on the development of a holographic-infill radar, which aims to solve the problem of wind turbine interference with air traffic radars. The system works by covering the area of the turbines with a short-range radar "patch" with a different characteristic. A test has shown that the method provides a Doppler effect for a target moving on the ground different from one produced by a turbine, a distinction, which it is believed would enable a full-scale system to detect an aircraft intrusion into a wind farm interference area. Flying tests are planned. [November 2008. Military Implications, Source[89]]

Environmentally Polluting Ash Turned into Concrete-like Structural Material

Prof. Mulalo Doyoyo of Georgia Tech's School of Civil and Environmental Engineering has developed a new structural material, Cenocell, that is produced by treating with organic chemicals fly ash and bottom ash left over from coal burning systems. It offers high strength and light weight, uses no cement, and could replace concrete, wood and other materials in many applications. [November 2008. Military Implications, Source[90]]

Another "Green" Concrete Announced

In a press release, Ekocrete, Inc. announced, "…the availability of a new 'green' concrete that uses 90% recycled and by-product materials without sacrificing strength or durability." The new product uses crushed recycled concrete for aggregate, plus fly ash waste from coal mills, and other industrial byproducts that provide nano-fibers for crack reduction and nano-particles for surface density to reduce water penetration. [January 2009. Military Implications, Sources[91]]

Integrated Monitoring/Control System Aids Buildings' Environmental Performance

Agilewaves Inc. of Menlo Park, CA combined its Resource Monitor with a Crestron control system to produce a smart building system through which energy consumption can now be automatically tracked and controlled in real time. The Resource Monitor collects data from sensors placed in key areas, providing real-time information on resource consumption that can be broken down to specific floors, rooms, and appliances. It then alerts the Control System to act and keep energy consumption within limits by adjusting a thermostat, lights, water or blinds, for example. [July-August 2008. Military Implications, Sources[92]]

Fiber Check Dams with Chemicals Control Polluting Construction Runoff

Research by Dr. Rich McLaughlin, associate professor of soil science at NC State Univ., and colleagues has shown that fiber check dams constructed from a mix of straw wattles and coir logs, with added granulated, anionic polyacrylamide (PAM), are enormously more effective in protecting watercourses from the muddy runoff around road and other construction projects than the currently used "sediment traps" and rock check dams in ditches. Turbidity of road runoff improved by a factor of more than 100. [April 2009. Military Implications, Sources[93]]

Technologies for New Generation of Cars

Largest Chinese Car Maker Produces All-electric Model

China's largest independent carmaker, Chery Automobile, has begun producing its first plug-in electric car, the S18, rated at 93 miles per charge, 72 mph, and charging times of 30 minutes/half charge, six hours/full. No general availability date has been announced [See also *All-Electric cars coming from Norway and China with More than Hundred Mile Ranges* in April 2008 and other related items in previous environmental security reports.] [February 2009. Military Implications, Source[95]]

Compressed Air Car May Offer Environmental Advantages

Zero Pollution Motors of New Paltz, NY is developing a compressed air vehicle planned for US production in 2010. The car may be viewed as an analogue of an electric car, with the battery replaced by a tank filled with air previously compressed by any electric energy source. The air runs a 2-, 4- or 6-cylinder engine, replacing the pressure otherwise generated by the explosion of fossil fuel vapors in the cylinders. [November 2008, Military Implications, Source[96]]

New Catalysts Improve Hydrogen Generation Processes for Energy Storage

Prof. Daniel Nocera of MIT announced development of a new electrolyzing technique that provides an efficient way to use electricity, as generated by solar panels or a wind farm, to split water into hydrogen and oxygen for storage and later use in a fuel cell. The technique is based on a novel cobalt/phosphate catalyst that allows the process to be carried out in an inexpensive non-specialized environment.

Similarly, scientists of Monash Univ. "have developed an efficient water oxidation catalyst, based on a manganese cubane cluster, which combines features of photosynthetic enzymes with the light harvesting power of dye-sensitized solar cells … [and, paired] with a proton reducing catalytic cathode, … have produced a photoelectrochemical cell that produces pure H_2 and O_2 from water and sunlight."

Finally, Prof. Umit Ozkan, of Chemical & Biomolecular Engineering at Ohio State University, designed an inexpensive cerium-based catalyst that produces hydrogen from ethanol or other biofuels. This would allow conversion from liquid fuel to hydrogen to be done at the final fueling point. [July-August 2008. Military Implications, Sources[97]]

New Materials Provide Hope for Improved Ultra-capacitor

EEStor, of Cedar Park TX, claims that its electrical energy storage unit will have more than three times the energy density of the top lithium-ion batteries today. The unit is based on a ceramic material consisting of a barium titanate powder coated with aluminum oxide and a type of glass material. Some experts have expressed doubts about the material's ability to withstand the high voltage gradients necessary to achieve the stated capacities, but others are more supportive. [July-August 2008. Military Implications, Sources[98]]

New Materials Provide Improved Ultracapacitor Storage

Hao Zhang of the Research Institute of Chemical Defense in China is lead author of a paper in Nano Letters describing a new structure for ultracapacitor electrodes consisting of flower-shaped

manganese oxide nanoparticles deposited on carbon nanotubes vertically grown on a tantalum-foil base. The authors report that the new arrangement delivers five times as much power as activated-carbon electrodes. Cost may be a problem with this technique. Also, Prof. Rod Ruoff of the University of Texas at Austin is working with graphene as an electrode material, and believes that it may double the storage capability of ultracapacitors. Jiyoung Oh and Mikhail "Mike" Kozlov at the Univ. of Texas at Dallas' NanoTech Institute are conducting similar work using sheets of single-walled carbon nanotubes embedded with the polymer polypyrrole. [September 2008. Military Implications, Sources[99]]

New Palladium-Platinum Catalyst Structure Increases Fuel Cell Efficiency

Prof. Younan Xia has led a group of scientists at Washington University and the Brookhaven National Laboratory in the development of a fuel cell catalyst nanostructure comprising a palladium core supporting dendritic platinum branches. This material and arrangement is two and a half to five times more effective than existing techniques. [May 2009. Military Implications, Source[100]]

Ion Jelly Electrolyte Offers Environmental Advantages

A team of researchers led by Susana Barreiros at the New University of Lisbon, Portugal, has developed a conducting "ion jelly" for use as an electrolyte in batteries and fuel cells. The new technique is superior to previous methods of turning environmentally friendly ionic liquids into solids. [October 2008. Military Implications, Source[101]]

Carbon Nanotubes Could Replace Expensive Platinum Catalysts in Fuel Cells

Prof. Liming Dai at the University of Dayton (Ohio) and his group have shown that arrays of vertically grown, nitrogen-doped, carbon nanotubes could be used as the catalyst in fuel cells, replacing expensive platinum catalysts now used; it is claimed that they would also be longer lasting than the platinum types. Other work in fuel cell electrodes is underway by Kotaro Sasaki at the Brookhaven National Lab (atom-thick platinum films), at Monash Univ. in Australia (a polymer, PEDOT), and at the Argonne National Lab (nanotube arrays with small quantities of platinum or iron). [February 2009. Military Implications, Source[102]]

New Materials Better for Separating Hydrogen from Other Gases

One of the biggest difficulties for the fuel cell economy is efficiently producing pure hydrogen. Mercouri G. Kanatzidis, a chemist at Northwestern University, has developed a new class of honeycomb-like porous materials (a new family of germanium-rich chalcogenides) that are much more effective than current methods at separating hydrogen from complex gas mixtures. The technology is based on the differing behaviors of varieties of gas molecules as they pass through the separation material. [February 2009. Military Implications, Sources[103]]

Electrostatic Capacitors Offer Energy Storage Improvement

Prof. Gary Rubloff, director of the University of Maryland's NanoCenter, and his team have developed a family of nanotech-based electrostatic capacitors suitable for energy storage for such devices as electric vehicles. They are said to offer a 10 times improvement in energy storage

density over current commercially available devices, while preserving high power and fast recharge characteristics. [March 2009. Military Implications, Source[104]]

New Lithium-Ion Material Improves Recharging Time

Gerbrand Ceder and Byoungwoo Kang of the Dept. of Materials Science and Engineering at the Massachusetts Institute of Technology announced development of a new lithium-ion battery electrode material which they hope will give batteries a fast charging time equivalent to that of a supercapacitor. The material consists of nanospheres with a core of lithium iron phosphate and a surface of glassy lithium-phosphate, with the latter providing a fast path for electron travel during recharging. [March 2009. Military Implications, Sources[105]]

Lithium-sulphur Battery Problem Solved by Nanotechnology

Researchers led by Prof. Linda Nazar at the Univ. of Waterloo, Ontario, have developed a cathode nanostructure for a lithium-sulphur battery that can store and deliver more than three times the power of conventional lithium ion batteries, according to Nanowerk News. [May 2009. Military Implications, Source[106]]

New Fuel Cell Membrane May Solve Dry Surroundings Problem

Researcher Cy Fujimoto of the Sandia National Laboratories is developing a new type of polymer electrolyte membrane for fuel cells. The new material aims to solve the problem of dehydration and consequent diminished functioning of fuel cells in dry desert environments. [June 2009. Military Implications, Source[107]]

Environmental Advantages in New Methanol Production Process

Scott Barnett at Northwestern Univ., Evanston IL, and colleagues have demonstrated a new environmentally friendly technology that uses a solid oxide electrolysis cell to turn CO2, hydrogen, and water into syngas (H + CO), which can then be converted into methanol, a competitor to hydrogen for energy storage and production. A “methanol economy” has the advantage over hydrogen of using the existing liquid-fuel-oriented storage and distribution infrastructure. The current syngas production processes are based on fossil fuels, and have negative environmental impacts. [June 2009. Military Implications, Source[108]]

Increasing Energy Efficiency Technologies

Study of Cost and Availability of Possible New Solar Cell Materials

A new study from the Energy and Resources Group and the Department of Chemistry at the University of California, Berkeley, and the Lawrence Berkeley National Laboratory (LBNL) investigates the cost and availability of a number of possible solar cell materials. According to a story from the Environmental News Network, “The UC Berkeley study evaluated 23 promising semiconducting materials and discovered that 12 are abundant enough to meet or exceed annual worldwide energy demand. Of those 12, nine have a significant raw material cost reduction over

traditional crystalline silicon, the most widely used photovoltaic material in mass production today." [February 2009. Military Implications, Sources[110]]

Nanoparticles Increase Solar Cell Light-gathering Efficiency by 30%

Work led by Kylie Catchpole, now at the Australian National University, has resulted in the discovery that a thin film of metallic nanoparticles applied to the surface of a solar cell can increase light capture for long-wavelength light by a factor of more than ten, and improve overall cell light-gathering efficiency by 30%. [December 2008. Military Implications, Source[111]]

Diatoms Help Build Better Dye-sensitized Solar Cells

Researchers at Oregon State University and Portland State University have created a new way to make "dye-sensitized" solar cells, according to an announcement by chemical engineering Prof. Greg Rorrer at OSU. It turns out that diatom skeletons have an ideal nanostructure to serve as the basis for the semiconductors for a dye-sensitized solar cell. The skeletons may have come from diatoms raised in an environment containing titanium rather than silicon, so that they actually consist of titanium dioxide, or they may be normal skeletons that have been "frosted" with the titanium material. In either case, the physical "shape" of the diatom film is such that a solar cell made with these semiconductors is more efficient at converting incident light into energy. [April 2009. Military Implications, Source[112]]

Genetically Engineered Viruses Produce Advanced Battery Electrodes

Profs. Angela Belcher, Gerbrand Ceder, and Michael Strano of MIT have developed the first devices that use a potentially fast and inexpensive technology in which battery anodes and cathodes are "grown" by a genetically engineered bacteriophage that accumulates conductive materials on a polymer separator. The researchers are now working on up- and down-sizing the components, and improving their rechargeability life. [April 2009. Military Implications, Source[113]]

First Flexible Supercapacitor Built

Prof. George Grüner's group at UCLA has developed the world's first flexible supercapacitor by spraying carbon nanotubes onto plastic films that serve as both the device's electrodes and charge collectors. Their current designs are relatively inefficient, but the scientists believe that valuable insights are being obtained into the issues of manufacturing and material selection engineering. [April 2009. Military Implications, Source[114]]

Mobile Unit Turns Waste into Energy

The IST Energy Corp. of Waltham, MA has announced its new GEM (Green Energy Machine) mobile waste-to-energy conversion system that can turn two to three tons of post-consumer rubbish – paper, plastic, food, wood and agricultural materials – a day into usable "energy pellets" that can be gasified and used to run a natural gas generator, which in turn can power the unit. [February 2009. Military Implications, Source[115]]

Waste Gasification Still a Controversial Technique

A recent article in New Scientist reviewed the current state of waste gasification and also noted objections being raised to that technology. According to the article, "Pilot gasification plants are being set up at various sites in the US, Canada, France, the UK and Portugal, most of them using the plasma technique. Japan already has two commercial plasma plants, but these are focused primarily on simply disposing of household waste rather than generating energy from it." Plans for a large plant in Florida have been scaled down, and earlier plasma plants in Germany and Australia were shut down after failing to meet emissions standards. [April 2009. Military Implications, Source[116]]

Titanium Nanotube Catalyst A Step Forward in CO2 to Methane Conversion

Craig Grimes and his group at the Materials Research Lab of the Pennsylvania State University have developed a technology, based on catalytic titanium dioxide nanotubes coated with copper and platinum particles, that uses sunlight to convert a mixture of carbon dioxide and water vapor to natural gas at a rate twenty times higher than any previously published results. This is not yet a practical level, but the researchers are working on improvements that they hope would provide at least two orders of magnitude better performance. [February 2009. Military Implications, Source[117]]

Light Emitting Diodes Offer Big Environmental Advantages

A recent paper in the special energy issue of Optics Express summarizes the tremendous environmental advantages LEDs offer over other lighting means, and predicts "a revolution in energy-efficient, environmentally-sound, and powerfully-flexible lighting". They are 5 to 20 times as energy-efficient as other light sources, and their manufacture does not use toxic materials such as mercury. They also offer controllable color and polarization. Researchers in materials science and engineering at the University of Florida produced organic LEDs in various colors that achieve efficiencies of 50 lumens/watt (with hopes for 100 lumens/w or higher, eventually). [December 2008. Military Implications, Sources[118]]

Small Omnidirectional Wind Turbines Could Provide Remote Power

quietrevolution ltd. [sic] of London, England, has developed a wind turbine, which is silent, only 16' tall and 9' in diameter, and responds to wind from any direction. The manufacturer estimates its probable output on a typical site at 6000-10000 kWh per year, i.e., up to about 1 kW continuous equivalent. Further development is expected to greatly reduce its current cost of almost $45,000 plus installation. [September 2008; Military Implications, Sources[119]]

New Technique Provides Cheaper LEDs

A team at Cambridge University, led by Colin Humphrey, has developed a new production technique for gallium nitride LEDs that allows them to be grown on a silicon wafer and brings their price down to levels competitive with other types of light sources. [See *Light Emitting Diodes Offer Big Environmental Advantages* in December 2008 environmental security report.] [January 2009. Military Implications, Source[120]]

Photoelectric Energy Efficiency Increase by Photosynthesis-type Semiconductor Structure

Prof. P. G. Lagoudakis of the School of Physics and Astronomy, University of Southampton (England), and colleagues have developed a colloidal nanocrystal quantum dot technique. It was suggested by natural photosynthesis structures, and is reported to yield a six-fold increase in photocurrent conversion efficiency compared to previous semiconductor devices. [March 2009. Military Implications, Source[121]]

Space Technology

Increased Use of Space Technology for Monitoring Environmental Events
Greenhouse Gas Observing Satellite Could Help Enforcing Environmental Regulations

Increased Use of Space Technology for Monitoring Environmental Events

Kopernikus is the new name of the European joint earth observation system GMES (Global Monitoring for Environment and Security). In addition to monitoring environmental events, Kopernikus will enhance people's safety by providing early warnings of natural disasters and a basis of enhanced modeling activities to help better understand the drivers of climate change. The EU 5th Space Council adopted a Resolution on the priorities of Galileo and Kopernikus programs, while the Space Council highlighted the need to improve the coordination between civil and defense programs, and noted the intention of ESA's Director General to submit a proposal for a program on Space Situational Awareness to set the basis towards the development of a European capability for monitoring European space infrastructure and of space debris. Chinese officials say they have launched their first two natural disaster and environment monitoring satellites.

A report by the U.S. Climate Change Science Program concluded that the utilization of Earth science information to manage resources and protect public health should improve. [September 2008. Military Implications, Sources[122]]

Greenhouse Gas Observing Satellite Could Help Enforcing Environmental Regulations

Japanese Greenhouse Gases Observing Satellite "IBUKI" (meaning "breath") is the world's first satellite dedicated to monitoring greenhouse gas emissions. It circles the earth every 100 minutes and monitors the levels of CO2 and methane at 56,000 observation points. The data should help the global effort to understand and combat global warming. [January 2009. Military Implications, Source[123]]

Technologies that Could Trigger New Forms of Arms Race

International Standards Needed to Reduce Hi-tech SIMAD Threats

The development of artificial biology, cognitive science, nanotechnology, electromagnetic pulses, and other hi-tech advances, combined with the availability of information via the Internet and low-cost components necessary to produce hi-tech weapons by individuals or non-state actors, as well as the increase of terrorism and social unrest (often exacerbated by environmental

factors), increase the threat of SIMAD (single individuals massively destructive). "E-bombs" based on electromagnetic pulses are capable of destroying the electronics in civilian aircraft; suitcase-sized electronic warfare devices can disable the power grid of an entire region; and research on computer-mediated telepathy such as Silent Talk might one day be used to intercept and distort thoughts. There are no international standards to help prevent such hi-tech systems' future use by SIMAD. [See also *New Technologies Need New Regulations Systems* in March 2009.] [May 2009. Military Implications, Sources[125]]

B. Preventing or Responding to Environmentally Caused Conflicts

SECURITY IMPLICATIONS OF ENVIRONMNETAL ASPECTS

International Conference on Military's Role in Climate Change

The Importance of Military Organizations in Protecting the Climate 2008 conference, attended by over 100 military and environmental experts from 25 countries, plus the EU and UNEP, discussed the security implications of climate change and the role of the military community in addressing it. There was consensus that climate change is a conflict multiplier with global security implications such as: "creating new geopolitical areas of concern; inhibiting the ability to project power; jeopardizing coalition partnerships; increasing operations other than war; overloading UN peacekeeping deployments; and requiring urgent actions by military and civilian leaders and the public"[4]. Therefore military organizations should increase their role in protecting the climate by showing leadership in increasing energy efficiency through procurement and operations, R&D centers of excellence, and transfer of knowledge. Several best practices were discussed and a project was proposed for a global public-private partnership to cooperate in efforts to collect and destroy ozone-depleting substances. Some "visionary military climate strategies" included "self-sustaining energy at the battlefront; a Carbon Non-Proliferation Treaty; and cooperation on Arctic passage & resources"[5]. The conference, which is the fifth in a series that began in 1991, was held in Paris, November 3-5, co-hosted by the Institute for Governance and Sustainable Development and collaborators. [November 2008. Military Implications, Sources[128]]

Climate Change Triggers Redrawing Swiss-Italian Borders

Switzerland and Italy are cooperating in redrawing their national borders in the Matterhorn mountain area, due to melting Alpine glaciers that previously set the border lines. The new proposal considers the rocks rather than glaciers as border criteria. The Swiss-Italian border change will not affect any inhabited area. Franco Narducci, of Italy's opposition Democratic Party, who is preparing the bill for redefining the frontier, said that similar negotiations will be proposed to France and Austria. Redrawing these borders creates a precedent with implications for other effects of climate change in other regions such as the Arctic and Antarctic regions, and the Low-lying Island States. [March 2009. Military Implications, Sources[129]]

Climate Change Impacts Assessment on U.S. National Security

Assessment of Select Climate Change Impacts on U.S. National Security by the Center for International Earth Science Information Network (CIESIN) of Columbia University is a paper in reaction to the National Security Implications of Global Climate Change Through 2030 produced by the National Intelligence Council [see the respective item in the June 2008 environmental security report.] This extremely well-documented and illustrated paper identifies the countries at high potential security risk by examining and quantifying the security implications in three

[4] Conference Conclusions and Opportunities for Co-operation. Stephen O. Andersen, EPA Climate Liaison to the US Department of Defense. http://www.igsd.org//conferences/Paris2008/3%20Andersen%20conclusions.pdf
[5] Ibid.

specific domains: global sea level rise, temperature change, and water scarcity. The aggregate vulnerability index takes into account a nation's respective climate change aspect and adaptability capacity. As to sea level rise, the most vulnerable are highly populated, low-elevation coastal zones in China, India, Indonesia, Philippines, and Egypt. The countries identified as presenting high instability risk due to temperature change are South Africa, Nepal, Morocco, Bangladesh, Tunisia, Paraguay, Yemen, Sudan and Côte d'Ivoire, while water scarcity might possibly increase instability in Mozambique, Côte d'Ivoire, Nigeria, Iraq, Guatemala, Zimbabwe, Ethiopia, Somalia, China, Syria and Algeria. The paper makes some recommendations on strategies and policies that might help overcome and mitigate eventual threats. [July-August 2008; Military Implications, Sources[130]]

Global Climate Risk Index 2008

Global Climate Risk Index 2008 Weather-Related Loss Events and Their Impacts on Countries In 2006 And In A Longterm Comparison by Sven Harmeling analyzes to what extent countries and country groups have been affected by the impacts of weather-related loss events (storms, floods, heat waves etc.) whereby losses are quantified using four indicators: 1) total number of deaths; 2) deaths per 100,000 inhabitants; 3) absolute losses in million US$ PPP (purchasing power parity; and 4) losses per unit GDP. These analyses are based on assessments of the Munich Re database NatCatSERVICE®. The Global Climate Risk Index 2008 was published by Germanwatch, an independent NGO, with financial support from the German Federal Ministry for Economic Cooperation and Development (BMZ). [July-August 2008; Military Implications, Sources[131]]

UN General Assembly Stressed Environment-related Issues (September 2008)

The issues most frequently mentioned by heads of state and governments at the 63rd session of the UN General Assembly were the global food crisis, impacts of climate change, widespread hunger and poverty, access to water, nuclear control and disarmament, human rights, and terrorism. Ukraine suggested the development of a World Environmental Constitution as a binding framework agreement, and the establishment of a UN entity with authority for ecological protection. Mexico proposed a UN-managed Green Fund to help poor nations cope with the effects of climate change. Small island developing nations that are under imminent threat due to rising sea levels appealed for measures to ensure their survival and the Pacific Islands Forum will resubmit a resolution asking the Security Council to investigate the peace and security implications of global warming, although Solomon Islands' Prime Minister Derek Sikua expressed fears that the magnitude of climate change has already outgrown the existing capacity of the UN system to respond. [September 2008. Military Implications, Sources[132]]

Future Lithium Dependency Raises New Energy Security Concerns

World demand for lithium is growing rapidly. It is the key element of improved batteries for electric and hybrid vehicles, cell phones, laptops, etc. today. Bolivia has nearly half the world's lithium reserves and will build lithium batteries domestically. Allegedly, some attempts by US, Japanese and French electric car makers to obtain lithium concessions failed. Official talks of plans for establishing a lithium cartel similar to OPEC to control the resource raise new energy security concerns. Current large lithium producers are Argentina (about 50% of current world production), Chile, China, and Australia. However, at the recent Lithium Market and Supply

conference held in Santiago, Chile, it was said that there is plenty of lithium supply to meet demand for the foreseeable future. Considering the potential energy and environmental security implications of access to lithium reserves, it is wise to develop alternative battery technologies, such as those based on sodium nickel chloride or zinc-air, that do not face resource depletion or restriction issues. (Reportedly, Toyota and Germany's RWE are focusing R&D on zinc-air batteries.) [March 2009. Military Implications, Sources[133]]

Global Trends 2025: A Transformed World

Global Trends 2025: A Transformed World by the US National Intelligence Council is an analysis of threats to security and potential geopolitical developments. It features four scenarios: "A World Without the West"; "October Surprises"; "BRICS's Bust-up"; and "Politics is not Always Local." It includes a chapter on "The Demographics of Discord" (chapter 2), as well as a section on "Water, Food, and Climate Change" (in chapter 4: "Scarcity in the Midst of Plenty?") [November 2008. Military Implications, Source[134]]

Threats and Strategies for Addressing Climate Change in the Middle-East

Rising Temperatures, Rising Tensions; Climate change and the risk of violent conflict in the Middle East, by the International Institute for Sustainable Development, is an analysis of the security issues in the Levant region over the period to 2050, in view of the implications of climate change. Acknowledging that the legacy of 60 years of conflict undermines adaptation efforts, it identifies and details six climate change-related potential threats which are likely to become obstacles to peacebuilding: 1) increasing competition over scarce water resources; 2) intensifying food insecurity; 3) worsening poverty and social instability; 4) forced migration; 5) "militarization of strategic natural resources;" and 6) the danger of inaction on climate change, which might lead to "growing resentment and distrust of the West (and Israel) by Arab nations." The study also suggests four strategies that could turn climate change into a peacebuilding tool: promote conservation and efficiency; develop joint adaptation projects, including water management; advance solidarity and green energy policies; and be actively involved in developing regional and international adaptation strategies. [Previous related items: *Security Risk due to Climate Change* in December 2007, *Security Implication of Climate Change to the EU* in March 2008, and *Food and Water Security* in October 2008 environmental security reports.] [June 2009. Military Implications, Source[135]]

UNEP Year Book 2009

The UNEP Year Book 2009 offers a view on scientific understanding of global environmental change and foreseeable issues, helping to raise awareness about potentially threatening issues. It outlines some policies and actions that could help mitigate climate change and reduce the human environmental footprint. [February 2009. Military Implications, Sources[136]]

State of the World 2009

State of the World 2009: Into a Warming World by Worldwatch Institute is a comprehensive analysis of potential evolution of climate change by the end of the century and of the urgent actions and policies that need to be taken now. It is "intended to inject new inspiration and energy into national and international climate negotiations." It examines the technologies that

would be the most efficient for reducing greenhouse gas emissions; policies and strategies to address climate change; ideas for saving biodiversity; and security implications of climate change. It also includes a climate change reference guide and glossary. [January 2009. Military Implications, Source[137]]

Tools for Addressing Humanity's Growing Ecological Footprint

Earth Overshoot Day this year was on September 23 and is moving forward each year, notes Global Footprint Network. In 2008, humanity used about 40% more than nature can regenerate resources and absorb waste. The Living Planet Report 2008, which documents the extent of human pressure on the planet, reveals that 75% of the human population lives in countries that are "ecological debtors," demanding more biocapacity than they have within their borders. According to UN moderate projections, by the mid-2030s we will need the equivalent of two Earths to support us. The Ecological Footprint Atlas 2008 offers country-by-country graphs, data tables, and sources, representing a valuable tool to help manage our ecological assets. Conservation International is launching a new environmental protection resource, the Integrated Biodiversity Assessment Tool (http://biodiversityinfo.org/ibat/), which will provide a centralized source from which organizations can obtain comprehensive information on their possible ecological impacts. [October 2008. Military Implications, Sources[138]]

miniAtlas of Human Security

The miniAtlas of Human Security, produced by the Human Security Report Project at Simon Fraser University, Canada, is a comprehensive illustrated guide of global and regional trends in human insecurity—with details on: armed conflicts, genocides and other forms of deadly violence against civilians; fatalities from political violence; numbers of refugees and other displaced peoples; and respect for human rights. [October 2008. Military Implications, Sources[139]]

Improved Governance Needed for Reducing Risks of Environmental Disaster

2009 Global assessment report on disaster risk reduction: risk and poverty in a changing climate is the first biennial global assessment of disaster risk reduction coordinated by the UN International Strategy for Disaster Reduction (UNISDR). The study is a comprehensive analysis of disasters and their effects, with concrete suggestions. It notes that between 1990 and 2007, global disaster risk increased by 13% as mortality, and 35% as economic loss, with low- and middle-income countries bearing far greater burden because of weak economic and governance systems. For example, Japan and the Philippines have roughly equivalent population exposure to tropical cyclones, but 17 times more people would die in the Philippines than Japan. The study identifies three primary 'risk drivers': unplanned urban development, vulnerable livelihoods, and ecosystem decline, each exacerbated by climate change, and proposes a 20-point action plan based on major shifts in development thinking by including preparedness in all strategies at international, national, and community levels.

The study *The View From the Frontline*, to be released in June, conducted by the Global Network of Civil Society Organizations for Disaster Reduction, focus on communities' role in reducing disaster effects and calls for systemic changes in policy by governments. For example, the study says, education in local communities is needed to overcome a tendency to accept high

disaster tolls as a matter of fate, instead of, for example, a result of lax building codes or lack of warning systems.

The *Climate Gap*, a study by a team from the University of California, Berkeley, documents how poor people are disproportionately affected by climate change in the U.S., and warns that a widening "climate gap" could exacerbate current and future social disparities. Therefore, the report highlights the importance of including environmental justice in climate change policies. [May 2009. Military Implications, Sources[140]]

Arab Mediterranean Governments' Environmental Security Cooperation

The Environmental Security in the Arab and Mediterranean sphere: Role of the Civil Society conference was organized by the Association of the Mediterranean Network for Sustained Development (ARREMED) and the Arab Environment and Development Network (RAED), in Tunis. Attended by high-ranking diplomats and environment and security experts, the conference discussed cooperation and common policies for addressing environmental and human security in the Arab Mediterranean spheres. "Governments should unify policies on environmental security and strengthen partnership in matter of scientific research between Arab countries and prepare a survey of possible risks to evaluate their impact and their cost," stipulates the conference declaration. Highlighted was that tackling environmental issues is imperative mainly in conflict-threatened regions. Along the same lines, the *Arab Environment: Future Challenges* report launched at the annual conference of the Arab Forum for Environment and Development held in Manama, Bahrain, recommends urgent action in four major areas: fresh water scarcity, desertification, air quality, and marine pollution, all of which will likely worsen due to climate change. [November 2008. Military Implications, Sources[141]]

Water and Environmental Research Center to Be Established in UAE

The UAE University in Abu Dhabi has been funded to create a Water Environment Centre of Excellence. The research generated will be published, contributing to solving water- and environment-related problems in the UAE as well as in neighboring countries. Mohsin Al Sharif, head of the new center, said that one of the objectives is also to review UAE water-related policies. [December 2008. Military Implications, Sources[142]]

New Report Summarizes Pacific Environmental Threats and Solutions

The Pacific Ocean Synthesis report, from the Center for Ocean Solutions, presented at the World Ocean Conference in Manado, Indonesia, in May 2009, discusses environmental threats and potential solutions in seven regions of the Pacific, It represents the results of a review of more than 3,400 publications from 50 countries in the Pacific basin, and both synthesizes information from research and points out gaps in the studies. [June 2009. Military Implications, Sources[143]]

Arctic Debate

Arctic Council Declation, 2009

The declaration adopted by the Arctic Council ministerial meeting held in Tromsø, Norway, April 28-29, 2009, represents a comprehensive instrument for international cooperation and

policies in the region. Some of the most significant issues are: negotiation of an international instrument for cooperation on search and rescue services; a demand for the IMO to develop new guidelines for ships operating in Arctic waters and mandatory regulations on safety and environmental protection in the region; development of standards and guidelines for economic activities and oil and gas exploration in the Arctic; creation of a task force on short-lived non-CO_2 drivers of climate change such as black carbon, methane and tropospheric precursors in Arctic climate change; ecosystems-based ocean management; and addressing effects of climate change on indigenous people and ecosystems. Russia said that it opposes the presence of any military-political blocs in the Arctic and invited support for its new initiative "The Electronic Memory of the Arctic," an open access on-line information resource. The request of the EU, China, Italy, and South Korea for permanent observers' status was put on hold for now. The next ministerial meeting of the Arctic Council will be in 2011, although, given the increasing importance of the Arctic, meetings at political level will be held yearly. Denmark will take over the chairmanship of the Arctic Council. [April 2009. Military Implications, Sources[145]]

Resources Trigger Overlapping Claims for Maritime Areas

A Russia assessment of security threats up to 2020, notes that fights over the world's energy reserves could trigger military clashes, specifying the Arctic as a vulnerable area along with the Middle East, Central Asia, and the Caspian Sea.

May 13 was the deadline for the 128 states which became parties to the UN Convention on the Law of the Sea prior to May 1999 to submit to the Commission on the Limits of the Continental Shelf claims for extending their rights beyond the present lines. A total of 50 submissions were received from 43 states, while 37 states made preliminary submissions. States that acceded to UNCLOS after May 1999 have 10 years from date of the Convention entered into force for them to make a submission or provide preliminary information to the CLCS. This leaves the Arctic region open to debate, since Canada and Denmark have until November 2013 and November 2014 respectively, while the U.S. has yet to ratify the LOS.

Canada also has disputes with France over the rights to the rich oil and gas reserves of the seabed surrounding the small islands of St. Pierre and Miquelon, off the coast of Newfoundland.

One of the most complicated areas is the South China Sea, where China, the Philippines, Vietnam, Taiwan, Indonesia, and Malaysia have overlapping claims, with China asserting sovereignty over a series of islands and the respective seabed reserves.

A vast area around the Falkland Islands, South Georgia and South Sandwich Islands in the South Atlantic, with seabed rich in oil and minerals, is the object of overlapping claims from the UK and Argentina.

Countries that have also recently made submissions or informed the CLCS of their intention to claim extending their continental shelf include Cook Islands, Fiji, Benin, Somalia, Oman, Vanuatu, Ghana, Pakistan, South Africa, Nigeria, Sri Lanka, Kenya and others. In some cases, the claims are linked to previous unresolved international conflicts and boundary disputes. However, the Commission's rulings are only advisory and intended to be used for negotiations and, if necessary, arbitration.

Meantime, the energy-rich seabed of the Caspian Sea is the object of negotiations among Russia, Kazakhstan, Azerbaijan, Turkmenistan and Iran, while also being a crucial element for EU's alternative energy supplies from Central Asia. [See also *New Developments Concerning the Arctic* in April 2009, *Disputes over Polar Regions Expands* in October 2007, and other related items in previous environmental security reports.] [May 2009. Military Implications, Sources[146]]

New Arctic Maps Detail Geological Features

The most comprehensive geological atlas of the Arctic has been published. It maps detailed information on continental plates, rock types, and highlights the potential reserves of oil, gas, and other mineral resources. It estimates that the area within the Arctic Circle might contain around 30% of the world's undiscovered gas resources and 13% of oil reserves. The research, published in Science magazine, is the result of data compiled over several years by an international team of northern countries researchers. Meanwhile, Durham University updated its map of the Arctic highlighting the disputed territories. These publications should aid in environmental surveillance, resource exploration, and negotiation of Arctic sovereignty disputes. [May 2009. Military Implications, Sources[147]]

Canada Enhances its Arctic Surveillance

Canada announced the location of the two satellite reception ground stations for the Polar Epsilon project designed to enhance its Arctic surveillance and security capabilities and capacity to exploit space-based data for defense, maritime security and environmental monitoring. [April 2009. Military Implications, Sources[148]]

Norway Defins Its Continental Shelf

Norway became the first Arctic nation to accept limits to its northern seabed with the new defined continental shelf at 550 kms (342 miles) from the Pole, which is claimed by both Russia and Denmark. [April 2009. Military Implications, Sources[149]]

Potential NATO Military Presence in the Arctic

Delegates to a NATO meeting held in Iceland discussed the security implications of Arctic thawing and the potential need for a NATO military presence in the region. In view of the arguments among powerful nations over sovereignty and resources, NATO Secretary-General Jaap de Hoop Scheffer noted, "It should be a military presence that is not overdone, and there is a need for political cooperation and economic cooperation." The U.S. Arctic policy was published January 9, 2009. [January 2009. Military Implications, Sources[150]]

Arctic Needs New International Regulations

Legal experts participating to the Polar Law Symposium hosted by the United Nations University and the University of Akureyri in northern Iceland, September 7-9, 2008, concluded that a new legal framework is needed for the fragile and changing polar regions. They put forward a set of recommendations to governments, international bodies and other interested parties (to be distributed within six weeks of the event). "Many experts believe this new rush to the polar regions is not manageable within existing international law," said A.H. Zakri, Director of the UNU Yokohama-based Institute of Advanced Studies, while Tatiana Saksina of the WWF expressed that "there should be new rules, stricter rules. We are proposing a new convention for the protection of the Arctic Ocean."

Meantime, Russian President Medvedev re-launched military patrols in the Arctic waters and called on the security agency to establish a formal border in the region since it had "strategic

importance" for Russia, while Gazprom announced the creation of a subsidiary company for the Arctic reserves exploration.

The economic benefits of an ice-free Arctic are also pushing the EU's polar strategy up on the policy agenda, while a US-Canada expedition will explore the Arctic region, collecting data for mapping the Arctic seafloor and studying the geology of the sub-seafloor to build the case for the two countries' rights. [September 2008; Military Implications, Sources[151]]

European Parliament Adopted Resolution on Arctic Governance

A resolution adopted by the European Parliament on October 9 regarding Arctic governance stipulates that the European Commission should get an 'observer status' on the Arctic Council to increase its proactive role in the region and should set up a "dedicated Arctic desk." It also suggests that the EC open negotiations for an international treaty for the protection of the Arctic, which at the beginning should cover at least the unpopulated and unclaimed areas. Along with preservation, the commission should also consider a framework for possible exploitation of the Arctic's potentials. The MEPs expressed concerns that the ongoing race for Arctic resources could lead to security threats for the EU. The EU is due to publish its own guidelines for work in the Arctic this November. [October 2008. Military Implications, Sources[152]]

EU Arctic Policy Guidelines

The recently published EU 'Communication' concerning the Arctic stipulates that the Arctic becomes a priority in the European Northern Dimension policy due to potential implications for European security and stability. It outlines the EU Arctic framework built around three main policy objectives: "1) Protecting and preserving the Arctic in unison with its population; 2) Promoting sustainable use of resources; and 3) Contributing to enhanced Arctic multilateral governance." [November 2008. Military Implications, Sources[153]]

Nordic Countries Alliances for Addressing Arctic Issues

At a NATO Seminar on Security Prospects in the High North, held in Reykjavik, Iceland, Secretary General Jaap de Hoop Scheffer underlined that changes in the Arctic region will increase the Alliance's role in the area. The Allied nations have the necessary capabilities and equipment to address potential risks linked to increased activities in the Arctic region, and the Euro-Atlantic Disaster Response Coordination Centre has the necessary expertise for relief and rescue operations. Along the same lines, a 13-point Proposal was presented at the extraordinary meeting of Nordic foreign ministers held in Oslo, February 9, 2009, laying out the framework for the creation of Nordic cooperation on foreign and security issues, including a Scandinavian Defence Union to include Denmark, Finland, Norway, Sweden, and Iceland. Considering the rapid Arctic ice retreat, the report suggests the establishment of a monitoring and early warning system (including a polar orbit satellite system by 2020), as well as a common rescue force (to include both civilian and military personnel), rapidly deployable in case of disastrous events in the Nordic sea areas. The integrated Nordic system and "battlegroup" would be the first such regional initiative. The proposal will be further discussed in April, at the Nordic foreign ministers meeting in Reykjavik. [February 2009. Military Implications, Sources[154]]

Russian Security Unit and Draft Law for Reinforcing Arctic Claims

The Arctic Group of Forces under the jurisdiction of the Russian Federal Security Service is planned to be deployed by 2020. Its mission will be to consolidate security and environmental protection in the area, as well as to participate in defining the Arctic Shelf "with respect to Russia's national interests." In the meantime, Russia is drafting a new law that would allow it to block foreign military vessels, deny entry to, or impose Russian escorting on, commercial ships deemed unsafe for navigation, and charge fees. NATO's recent report, New Horizons, highlighting that the Arctic is becoming of "prime strategic importance," notes that Russia will begin exploitation at a major oil and natural gas field in the Arctic in 2013—the deadline year set by the UN for the Arctic continental shelf demarcation. [March 2009. Military Implications, Sources[155]]

The Debate over Strategic Control of the Arctic is Heating Up

In 2008, for the first time in known human history, both the Northwest and Northeast Passages are free of ice, opening the opportunity for the Arctic shortcut shipping route. Scientists estimate that by the summer of 2030, the Arctic might be completely ice-free for a few weeks. This increases concerns over security, environment, and resource-race issues, but, most of all, over the strategic control of the Arctic. While the multilateral negotiations are stalled, the Nordic countries continue to build their cases for territorial and security claims.

Canada is expanding by half a million square kilometers its Arctic Ocean territory—doubling the 100 nautical miles of the coastline that it presently regulates—and will make it mandatory for all ships entering its polar waters to report their presence. By the current regulations, registration with national authorities of ships in the Arctic is voluntary. "Canada takes responsibility for environmental protection and enforcement in our Arctic waters," said Prime Minister Stephen Harper. The claim includes the Northwest Passage, which no other country recognizes as a Canadian waterway. At a geology conference in Norway, Canada detailed its territorial claims to the Lomonosov Ridge, arguing that the ridge is part of the North American continent, not part of Siberia, as Russia has asserted. Canada's argument is supported by the Danish government, which also hopes to expand its part of the energy-rich ridge. Meantime, Greenland, encouraged by possible increased revenues from resource exploitations, hopes to become financially independent and therefore aspire to its own sovereignty.

Meantime, a U.S. Coast Guard-led expedition was sent out on a mapping mission to determine the extent of the continental shelf north of Alaska and map the ocean floor. The data gathered could be used for oil and natural gas exploration. Margaret Hays, the director of the oceanic affairs office at the U.S. State Department, said the Alaskan continental shelf may lie up to 600 nautical miles from the coastline, far beyond the 200-mile economic exploitation zone. The UN deadline for territorial claims is 2013.

Meantime, China sent its third expedition to the North Pole, saying its purposes are purely scientific, for studying climate change in the area and possible implications for China, rather than exploration of natural resources.

In view of the Arctic debate, Durham University's International Boundaries Research Unit has prepared a map and explanatory notes showing the region's current state of affairs and key disputed territories. The map should help politicians and policy makers to understand areas of maritime jurisdiction as they engage in and try to settle sea territorial disputes.

As the ice recedes, new rules are needed to prevent "a rush to exploit all the available resources of the Arctic - another Klondike - and avoiding the destabilizing effects of massive

infrastructure developments," said Jacqueline McGlade, executive director of the European Environment Agency. [July-August 2008; Military Implications, Sources[156]]

Greenland Moving Towards Independence

In what might be an example of political and sovereignty implications of climate change, Greenland took another step towards full independence from Denmark. It was granted self-rule status, recognizing Greenlanders as a distinct people with Greenlandic as the territory's official language and with the right to self-determination, including control over its natural reserves — gas, gold and diamonds. The warming climate could open access to the untapped wealth and pave the road towards economic independence. A referendum held in November 2008, showed more than 75% support of the residents for taking charge of the police, justice, and security responsibilities. [June 2009. Military Implications, Sources[157]]

NATURAL DISASTERS AND SCIRNTIFIC EVIDENCES

New 2009 Terminology on Disaster Risk Reduction

United Nations International Strategy for Disaster Reduction (UNISDR) released an extensively upgraded terminology to help international common understanding and application of disaster risk reduction concepts. It also includes new concepts that are not in widespread use but are of growing professional relevance. [January 2009. Military Implications, Source[159]]

Scientific Evidences and Potential Consequences

(Listed by month in reverse chronological order)

A new IPCC report, summarizing over 1,400 studies that were presented at the climate conference of March 2009 in Copenhagen, warns that changes in ocean temperatures and sea levels, extreme climate conditions, and the retreat of the Arctic sea ice are happening more rapidly than experts predicted two years ago, and concludes that "The world faces a growing risk of abrupt and irreversible climatic shifts."

World Disasters Report 2009 states that the 326 natural disasters that occurred worldwide in 2008 had a 235,736 death toll and the developing world suffered 76% of the disasters and 99% of the deaths. The *Human Impact Report: Climate Change—The Anatomy of a Silent Crisis* report claims that climate change affects 325 million people a year, at a total economic cost of $125 billion, and predicts that, by 2030, more than 660 million people would be affected, with potentially 500,000 deaths, and an economic loss rising to $340 billion

The Korea Meteorological Administration 10-years analysis shows that the Korean Peninsula is closer to a subtropical climate, due to climate change. For the 1999–2008 period, the average temperature was 0.6°C (1°F) higher than the 30-year average of the 1971–2000 period, while precipitation increased by an average 9.1%. [June 2009. Military Implications, Sources[161]]

Weather pattern changes observed now in Australia were not expected to manifest until 2020, says Professor Ian Lowe, one of the country's most prominent climate change scientists, who made such estimates 20 years ago.

The Assessment Report on Climate Change and its Consequences in Russian Federation, by the Russian Federal Service for Hydrometeorology and Environmental Monitoring, notes that over

the past century, the average surface air temperature in Russia has risen by nearly 1.3ºC, almost twice as much as the global mean. The assessment also details potential changes in permafrost by 2020 and 2050 due to climate change. Permafrost covers 60% of the land in Russia. [May 2009. Military Implications, Sources[162]]

A poll conducted by Reuters with experts, who were among authors of the 2007 IPCC report, attending the Bonn Climate Change meeting revealed high agreement that it is "unlikely" (less than 1/3 chance) the world would manage to limit warming to 2°C (3.6°F) above pre-industrial levels. Out of 11 scientists participating in the survey, 6 said world average annual temperatures would set a new record by 2015, and 4 said it would happen by 2020. As for sea level rise by 2100, projections varied from 30-40 cm (11.8–15.7 inches) to up to 140 cm (55.1 inches), and 10 of those polled projected that Arctic late summer sea ice could vanish before 2050, with two saying it would happen by 2020. A similar poll conducted by the Guardian with participation of 261 experts showed that 46% of those who answered the question on temperature rise estimated that it would reach 3–4°C (5.4–7.2°F) by the end of the century.
The *Right to Survive* report by Oxfam International reveals that the number of people affected by the 6,500 climate-related disasters recorded since 1980 has doubled in 30 years and estimates that by 2015 it might further increase by 54%, to an average of more than 375 million people per year. The emergency organizations might be overwhelmed by the rising number of people in poor countries affected by climate hazards, while worldwide emergency aid spending would need to be doubled to at least $25bn a year to help cope with the situation. [April 2009. Military Implications, Sources[163]]

"Worst case" scenarios are already becoming reality and an increase in average temperatures of 6°C (10.8°F) by the end of the century is not ruled out, cautioned over 2,500 leading environmental experts attending a climate summit held in Copenhagen ahead of the December post-Kyoto negotiations. They issued a statement warning that unless swift political action, "dangerous climate change," was imminent. Steven Sherwood, climate expert at Yale University, noted that due to the physiological limits of the human body, temperature rise by 7ºC (12.6°F) over pre-industrial levels would render many parts of the globe uninhabitable, while 10ºC (18°F) would encompass the bulk of today's population. Along the same lines, Hans Joachim Schellnhuber, director of the Potsdam Institute for Climate Impact Research in Germany, said that 5°C (9ºF) global warming over present values would reduce human population to 1 billion.

Global warming might be further exacerbated by CO_2 released from the Antarctic Ocean because of shifting wind patterns due to orbital shift, found a team of scientists at Columbia University's Lamont-Doherty Earth Observatory.
"Assessing Dangerous Climate Change Through an Update of the IPCC 'Reasons for Concern", a study published in the Proceedings of the National Academy of Sciences, updates some of the findings of the IPCC's 2001 Third Assessment Report. It found that even a lower level of increase in average global temperatures could have serious consequences in all five domains of concern analyzed: 1) risk to threatened ecosystems; 2) risk of extreme weather events; 3) vulnerability disparities; 4) damage assessment; and 5) risks of large-scale discontinuities due to phenomena with very large impacts (e.g. melting of major ice sheets.) [March 2009. Military Implications, Sources[164]]

A decade of drought, a record-breaking heat wave, and strong winds created exceptional conditions for the rapid spread of the bushfires in the state of Victoria, Australia. Over 200 people were killed and thousands of homes burned by the worst fires in the country's history. However, the region might expect longer and more extreme dry periods in the future due to climate change. The International Workshop on Drought and Extreme Temperatures organized jointly by the World Meteorological Organization and the China Meteorological Administration in Beijing, February 16-17, 2009, warned that the frequency and intensity of severe drought, heat waves, and wildfires are likely to increase this century. The regions considered most vulnerable to severe drought are: continental U.S. and Mexico, the Mediterranean basin, parts of northern China, southern Africa and Australia, and parts of South America. Severe heat waves are expected to increase everywhere, but especially in the continental western U.S., northern Africa, the Middle East, central Asia, and southern Africa and Australia. The issues will be further addressed at the World Climate Conference-3 to be held August 31-September 4, 2009 in Geneva. It was recommended that a drought index be developed to help the world better cope with increasing droughts and extreme temperatures.

The level of Africa's Lake Victoria, a vital source for the Nile, had dropped 3 meters over the past six years, due to warmer temperatures and reduced precipitation.

"The Humanitarian Costs of Climate Change" report reveals that natural disasters affect an average of some 250 million people yearly; and since 1992 nearly $2.7 trillion dollars have been spent on international response to environmental disasters. The report estimates that this spending could increase by 32%, considering changes in the frequency of disasters, and 1,600%, factoring in other criteria, such as intensity.

New data from the National Climatic Data Center show that global temperatures have risen 0.22° F since 1990. The organization warns that even lower warming levels in the future will cause serious consequences of water shortage, extreme weather events, and threats to ecosystems and humans. [February 2009. Military Implications, Sources[165]]

According to the Center for Research on Epidemiology of Disasters, in 2008 there were 321 disasters, below the 398 annual average for 2000–2007. Nevertheless, the 235,816 people killed, and the $181 billion in economic losses were considerably higher then the yearly average for the same period. About 211 million people were affected, with the highest number of deaths in Asia, mainly due to Cyclone Nargis and the Sichuan earthquake. The largest numbers of disasters were recorded in China—26, the Philippines—20, U.S.—19, Indonesia—16, and Vietnam and India—10 each.

A NASA study based on five years of data shows that for every 1°C (1.8°F) increase in average ocean surface temperature, there is a 45% increase in the frequency of the very high clouds associated with severe storms and rainfall. Senior Research Scientist Hartmut Aumann notes that at the present rate of global warming of 0.13°C (0.23 °F) per decade, the frequency of severe storms could increase by 6% per decade. [January 2009. Military Implications, Sources[166]]

The UN Inter-Agency Standing Committee and the UN International Strategy for Disaster Reduction noted that the number of disasters doubled over the past 20 years, reaching more than 400 annually and it is expected that the intensity, frequency, duration, and extent of weather-related hazards will rise over the next 20 years around the world. The UN Office for the Coordination of Humanitarian Affairs (OCHA) noted that in the period 1988-2007, over 75% of

disasters were climate-related, and accounted for 45% of deaths and 80% of the economic losses caused by natural hazards.

According to the World Meteorological Organization, in 2008 the average temperature on Earth was 0.31°C higher than the 1961–1990 levels, with serious changes in climate patterns, such as the warmest winter in more than 100 years in Scandinavia, the longest hot summer on record in parts of Australia, and unusual cold for a large part of Eurasia. Some parts of the U.S., India, Pakistan, Vietnam, and Bangladesh were the nations worst hit by the devastating effects of flooding and cyclones as a result of climate change, with tens of thousands of people losing their homes and more than 10 million displaced. The re-insurance company Munich Re said that 2008 was one of the most devastating years in terms of natural disasters, in both human and economic terms.

The British Met Office warns that the average global temperature for 2009 is expected to be more than 0.4°C above the long-term average, despite the La Niña phenomenon. NASA estimates that a 1°C increase in ocean surface temperatures could trigger a 45% increase in thunderhead formation, potentially increasing the frequency of severe tropical storms and their devastating impacts on developing countries by 6% in the next decade.

Other studies warn about climate change in different parts of the world: Latin America and the Caribbean might experience more destructive hurricanes and melting glaciers; New Zealand is threatened by drought, while the Arctic might have reached the point of irreversible climate change with temperatures rising much faster than anywhere else in the world. [December 2008; Military Implications, Sources[167]]

The World Meteorological Organization's Global Atmosphere Watch reports that climate-warming greenhouse gases reached record levels in 2007. Using the NOAA annual greenhouse gas index, it found that the total warming effect of long-term greenhouse gases has increased by 1.06% compared to 2006 and by 24.2% since 1990. WMO's *Greenhouse Gas Bulletin* reports that, compared to the previous year, CO_2 rose 0.5%, methane 0.34%, and nitrous oxide 0.25%, while slight decreases were noted for chlorofluorocarbons (mainly due to the implementation of the Montreal Protocol).

The 2008 Atlantic hurricane season set a few records in U.S. and Cuban recorded history—as to number, force, frequency and length of storms, say meteorologists. Data on consequences are still being calculated. [November 2008; Military Implications, Sources[168]]

Worldwatch Institute reports that 874 weather-related disasters were recorded in 2007, representing 91% of all natural disasters, the largest annual total since systematic recordkeeping began. These disasters caused $69 billion in recorded losses worldwide. The Institute says that there is a 66% likelihood that climate change will lead to more heat waves, heavier precipitation, broader droughts, and more-intense tropical cyclones—all of which could further increase the number of catastrophic weather events. Along the same lines, WWF's report *Climate change: faster, stronger, sooner* warns that Europe will be confronted with more extreme weather conditions from severe cyclones to heat-waves, floods, and droughts. [October 2008; Military Implications, Sources[169]]

The four tropical storms, Fay, Gustav, Hanna and Ike, destroyed all of Haiti's harvest, killed at least 328 people, and left some 800,000 people—about 10% of the population—in need of emergency assistance. Cuba, struck by hurricanes Gustav and Ike also suffered what the

government described as the worst damage in the island's history. In India, the unusually strong monsoon caused enormous flooding, with an estimated 3 million people in need of assistance "such that only the Army can handle it," said Parshuram Rai, director, Centre for Environment and Food Security (CEFS) in New Delhi.
Meantime, in the arid Somali Region of Ethiopia it has not rained for three years, and the Horn of Africa is facing a humanitarian crisis, with 17 million people, including 3 million children, in urgent need of food and other critical assistance.
Australia's national science agency, the Commonwealth Scientific and Industrial Research Organization, warned that the country should prepare a network of long-term coastal observation sites to improve large wave understanding and increase preparedness for more severe and frequent storms. [September 2008; Military Implications, Sources[170]]

The "Weather and Climate Extremes in a Changing Climate" report by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research warns that extreme weather events such as the drought that hit this year in Atlanta, the heat-wave in New York, and the flooding of Des Moines are likely to increase in frequency across North America as the planet warms.

At the opening of the 11th International Coral Reef Symposium in Fort Lauderdale, attended by more than 2,500 scientists and government officials, NOAA revealed that nearly half of U.S. coral reef ecosystems are considered to be in "poor" or "fair" condition.

A "Position Analysis: CO_2 Emissions And Climate Change: Ocean Impacts And Adaptation Issues" by the Australian Antarctic Climate & Ecosystems Cooperative Research Centre suggest that oceanic acidification rose to the point that it should be considered in security strategies and longer-term national risk assessments. The analysis states that CO_2 in the atmosphere is at its highest level in 650,000 (possibly 23 million) years, and half has been dissolved in the oceans, increasing their acidity. Ocean acidification affects coral structures, marine life, and fisheries, potentially threatening the food security of millions in the Asia-Pacific, and presenting strategic and humanitarian challenges. As environmental threats for Pacific Island communities increase, so mount demands on Australia to assist countries facing environmental disasters. [July-August 2008; Military Implications, Sources[171]]

MIGRATION TRIGGERED BY ENVIRONMENTAL CAUSES

Progress on Defining Environmental Refugees

The International Conference on "Environment, Forced Migration and Social Vulnerability" held in Bonn, Germany, October 9-11, 2008, summarized the current state of research and debate on matters concerning environmental migration and moved forward on the issues of definition: what should be considered environmentally-induced migration; measurement procedures and drivers; and legal instruments to protect and assist different categories of environmental migrants. The Council of Europe's Committee on Migration suggests that environmental migrants' rights should be considered either in "a separate Convention or as parts of intergovernmental environmental treaties, or as both", but disassociated from the 1951 Geneva Refugee Convention. The conference considered three categories of migrants: environmentally motivated migrants, environmentally forced migrants, and environmental emergency migrants.

The conference also introduced the Climate Change, Environment and Migration Alliance, designed to assist policymakers with environment-related migration issues; and presented preliminary findings by the Environmental Change and Forced Migration Scenarios Project that analyzes migration due to environmental factors in 22 case studies in nine regions. The EFMSV conference was hosted by the United Nations University, was attended by about 600 experts from nearly 80 countries, and was the largest meeting ever held on the topic. The full outcomes of the conference were not yet available at the time of this writing. [See also *New Strategies Needed to Deal with Global Displacement and Migration* in October 2007 and other similar items in previous environmental security reports.] [October 2008. Military Implications, Sources[173]]

Environmental Refugees Cyberseminar Revealing Difficulties of Defining Environmental Refugees

A cyberseminar on "Environmentally Induced Population Displacements" conducted August 18-29, 2008 by the Population-Environment Research Network in collaboration with the Environmental Change and Security Program of the Woodrow Wilson International Center for Scholars (http://www.populationenvironmentresearch.org/seminars.jsp) revealed the difficulty of defining environmental refugees. However, there were suggestions that the ongoing academic debate should be associated with more practical applications due to the urgency of the situation. [July-August 2008; Military Implications, Sources[174]]

Climate Refugees Trends

More than 200 million people could be displaced due to climate change by 2050, underlines the report *In Search of Shelter: Mapping the Effects of Climate Change on Human Migration and Displacement* by a consortium of several international organizations. The report presents several maps of climate change impacts and population distribution patterns, and suggests that a better understanding of the dynamics of climate-related migration and displacement is needed in order to incorporate human mobility into international and national adaptation plans. Meantime, Christian Aid estimates that climate-induced displacement could be closer to one billion by 2050. Nevertheless, the debate over a framework to deal with this increasing segment of the population continues. Developed countries tend to oppose the term 'refugee,' that might imply application of the 1951 UN convention on refugees, and favor other terms, like 'environmentally induced migration.'

The Global Governance Project launched the Policy Forum on Climate Refugees, a Web-based clearinghouse with up-to-date information on climate-related migration. The Forum proposes the term 'climate refugees', defined as: "people who have to leave their habitats, immediately or in the near future, because of sudden or gradual alterations in their natural environment related to at least one of three impacts of climate change: sea-level rise, extreme weather events, and drought and water scarcity. The Forum's website is: http://www.glogov.org/?pageid=80.

"We've never before had to deal with disappearing states. Who's going to take responsibility for people who are losing their country?" asks Dr Charles Erhart, of CARE International, referring to disappearing island-states. [June 2009. Military Implications, Sources[176]]

Rising sea levels and extreme heat due to climate change, coupled with environmental degradation, would force Australia's indigenous people to move off their traditional lands, resulting in "cultural genocide" according to the Human Rights Commission's annual Native Title Report.

The Chinese government estimates that 150 million people will have to be resettled, mainly due to desertification, water shortages exacerbated by over-irrigation and climate change, and population increase. The Minqin regional population rose from 860,000 to 2.3 million over the last 60 years. [May 2009. Military Implications, Sources[177]]

A panel of experts from the EU and U.S. pointed out that without comprehensive analysis of environment-induced human migration—assessing when, where to, where from, and how many people are going to move—there is a danger of focusing on wrong areas, underestimating certain regions' needs while over-allocating resources to others. They also stressed that: climate security and energy security should be addressed jointly; and worse case scenarios should be analyzed against the tradeoffs that are realistically acceptable to cut emissions and address climate change causes and effects. The session "Climate Security Roundtable: U.S. and EU Research and Policy" was organized by the Environmental Change and Security Program of the Woodrow Wilson Center.

First the Maldives and now the president of Kiribati are calling on the international community to help relocate their populations due to forecasted sea level increases. [February 2009. Military Implications, Sources[178]]

The Australian Defense Force report *Climate Change, The Environment, Resources And Conflict*, warns of possible conflict in the South Pacific triggered by increased illegal immigration and fishing and potential failed states, as a consequence of climate change and rising sea levels.

In an address to the UN Security Council, UN High Commissioner for Refugees António Guterres warned of new forms of displacement, with natural disasters on the rise due to climate change. He explained the interrelationship between climate change, extreme deprivation, and conflict, and how they can exacerbate each other as causes of displacement. [January 2009. Military Implications, Sources[179]]

An estimated 6 million people a year could be displaced by climate change effects, meaning that by 2050, the numbers might be between 200 million and 250 million, putting heavy pressure on aid agencies to meet basic needs, said L. Craig Johnstone, UN Deputy High Commissioner for Refugees. At the Poznan climate change conference, discussions concerning environmentally induced migration focused on helping countries to address the problem within their borders by implementing climate change adaptation measures, rather than considering international aspects. Nevertheless, the European Parliament declaration adopted in June 2008 calling for a legal framework for the protection of the victims of climate events and other similar efforts of the global community increase the likelihood of addressing the international dimension of environmentally induced migration. [December 2008; Military Implications, Sources[180]]

Because rising sea levels are expected to eventually submerge most if the Maldives' 1,200 islands, President Mohamed Nasheed announced that the country will create a $1 billion fund from tourist revenues to explore the possibility of buying land to move its 400,000 population.

A year after cyclone Sidr hit in Bangladesh, 1 million people are still homeless. Additionally, some Bangladeshis have already begun relocating to higher lands. They argue that developed nations should be more open to accepting refugees.

Half of Nigeria's 150 million people might face displacement, as it is threatened by three effects of climate change: desert expansion in the North, farmland erosion in the East, and flooding from the Atlantic Ocean in the South. [November 2008; Military Implications, Sources[181]]

The Australian government has agreed to accept climate change refugees like the ones from Tuvalu, as a last resort, and might create a new visa category to cover climate change refugees. Allegedly, the Tuvalu PM asked Australia to accept all 10,000 Tuvalians in a worst-case scenario. New Zealand now accepts 75 migrants a year. Expert groups indicate that mass evacuation might be necessary within decades. The situation extends to other low-lying nations such as Kiribati and the Maldives. [October 2008; Military Implications, Sources[182]]

Worldwatch Institute estimates that roughly one in every 36 people worldwide is moving involuntarily and warns that, as the trend increases, the international community is facing special challenges. Climate change will increase the ranks of "environmental refugees," especially of the 600 million people living in low-lying areas. A research team from the School of Oceanographic Studies at the Jadavpur University, Kolkata, India, estimate that out of the 4.1 million people living in the Sunderbans, the largest delta region in the world, 70,000 would become 'environmental refugees,' by 2020. The initial land given to relocated people was decreased and is causing discontent. The rate of sea level rise is currently approaching 3.14 mm per year near Sagar Island and this could increase to 3.5 mm in the next few years due to global warming. [September 2008; Military Implications, Sources[183]]

Bangladesh is considered among the countries most vulnerable to rising sea levels as a one-meter rise in sea levels could wipe out 20% of its landmass, creating 30 million environmental refugees by 2050. However, based on 32 years of satellite images, scientists from the Dhaka-based Center for Environment and Geographic Information Services, say that Bangladesh's landmass has actually increased by 20 square kilometers (8 square miles) annually due to sediment carried down by the big Himalayan rivers—the Ganges and the Brahmaputra. Nevertheless, the highly populated coastal area remains vulnerable to climate change effects such as shorter but more severe monsoons, more violent tropical storms, longer periods of drought, and increased salinization, all impacting people's livelihoods. [July-August 2008; Military Implications, Sources[184]]

RISING SEA LEVELS

Scientific Evidences and Potential Consequences

Computer models show that sea levels could rise faster along the U.S. East Coast than in other densely populated parts of the world, due to changes of pressure from ice caps melting, and ocean current modifications. In addition to sea level rises and erosion, the region from New York to North Carolina is falling about six inches per century.

The Maldives decided to adopt a "safe islands" program that includes 25% of its 196 low-lying islands and is considering abandoning the rest, according to one of the authors of a new study on the impacts of global warming. [June 2009; Military Implications, Sources[186]]

New melting estimates and their consequences show that melting of one of the world's largest ice sheets could alter the Earth's field of gravity and even its rotation, and disproportionately raise more sea levels on the west and east coasts of North America. [May 2009; Military Implications, Sources[187]]

According to a study by the National Centre for Space Studies in France, over the last 15 years the world's oceans have been rising at 3.4 mm a year, more than twice the average 1.7 mm recorded by tidal gauges over the past 50 years.

A Canadian research team, analyzing how the coastlines around the world would be affected by melting of parts of Antarctica discovered that modifications in the gravitational pull on the ocean will determine water moves that will cause different sea level rises in different parts of the world. An entire West Antarctic Ice Sheet melt might cause the Earth's rotation axis to shift approximately 500 metes from its present position, moving water from the southern Atlantic and Pacific oceans northward. Hence, while Southern Chile and Argentina might not experience sea-level change, Atlantic and Pacific coasts of Canada and the U.S. could experience as much as 6-7 meters sea level rise, inundating cities such as Vancouver and New York.

Erosion is another important phenomenon changing coastlines. *Geophysical Research Letters* reports that the rate of erosion along a stretch of Alaska's northeastern coastline has doubled over the past 52 years, increasing from 6.8 meters per year in the period 1955-1979, to 13.6 meters between 2002 and 2007, while from 2007 to 2008 the coastline lost 25 meters. The changes are attributed mostly to effects of climate change, such as stronger storms, loss of sea ice, warmer ocean, and sea level rise. [February 2009; Military Implications, Sources[188]]

Research published by European scientists in *Climate Dynamics* shows that the next century might be 3°C warmer, and the ocean level could rise between 0.9 and 1.3 meters. Similarly, models by the U.S. National Oceanic and Atmospheric Administration Earth Systems Research Laboratory show that sea levels would be 1.3 to 3.2 feet higher from thermal expansion of ocean water alone, if CO_2 increase would cap at 600 parts per million, but twice as much if CO_2 peaks at 1,000 parts per million. The models also showed that even if warming stopped, climate change effects might last until 3000.

According to a report by the State Oceanic Administration, the sea level along China's coastal areas has risen about 2.6 millimeter per year in the past 30 years, 0.8 millimeter higher than the world's average, and might rise 0.13 meter in the next three decades.

Tens of thousands of people were displaced in the Pacific islands as a consequence of climate change effects. Coastal residents of Fiji were instructed to move to higher ground to avoid storms and flooding. [January 2009; Military Implications, Sources[189]]

A compilation by a team of researchers from the University of Colorado at Boulder shows that when factoring in thermal expansion due to warming waters, total sea level rise could reach about 1–2 meters by 2100. They considered glaciological assumptions for sea rise expected from Greenland, Antarctica and the world's smaller glaciers and ice caps. Along the same lines, the *Abrupt Climate Change* report by the US Geological Survey found that sea level rise could exceed forecasts, possibly reaching 150 cm by the end of the century, an estimate which itself might "likely need to be revised upwards" because it doesn't fully count the ice flow processes. Jim Hansen, of NASA, also says that most estimates of sea level rise are too conservative, since climate system feedback could quickly accelerate ice melt, leading to a runaway collapse.

At the Poznan climate conference, a group of 43 small island states, saying that rising seas could wipe them off the map, called for tougher goals for emissions reductions and limiting global warming to a maximum of 1.5°C (2.7° Fahrenheit) above pre-industrial times, which is far lower than the EU suggested 2°C. "We are not prepared to sign a suicide agreement that causes small island states to disappear," said Selwin Hart of Barbados, a coordinator of the alliance of small island states, referring to a too weak climate change agreement.

A sudden sea swell hit Papua New Guinea in December, affecting some 32,000 peoples and their livelihood. A UN Disaster Assessment and Coordination (UNDAC) team went to the area to assess first aid needs. [December 2008; Military Implications, Sources[190]]

Satellite observations reveal that since 1993 sea level has risen by 3.3 mm a year, almost double the rate of the previous 50 years. While for 1993-2003, about half of the sea level rise was due to the oceans expanding as they became warmer and the other half was due to shrinking land ice, since 2003, about 80% of the annual sea level rise can be attributed to land ice loss from glaciers, Greenland, and Antarctica. [November 2008; Military Implications, Sources[191]]

WWF's report *Climate change: faster, stronger, sooner* estimates that sea levels' rise by 2100 might reach more than double the IPCC's maximum estimate of 0.59m. UN-Habitat's *State of the World's Cities Report 2008/09: Harmonious Cities* highlights the vulnerability of 10% of the world population that lives in low elevation coastal zones, mainly urban populations in deltas. Improving infrastructure is one of the essential first steps for reducing the impact of sea level rise on the population. UNDP predicts that there might be 30 million Bangladeshi refugees by 2050, due to sea level rise. Jakarta could be under water by 2025 due to groundwater mining and rising sea levels. Although Bangladesh's landmass is increasing by 20 sq km annually as a result of deposits in the Bay of Bengal by big Himalayan rivers, they become inhabitable only after several years and the country's existing landmass is being washed away faster than new land is being formed. Some islands, such as Kutubdia, are already becoming uninhabitable and the population has to relocate.

A new study by the University of New South Wales examining the effect of climate change on the Australian region from the Central Coast to Wollongong reveals that, by 2050, sea level rise is likely to be 40 centimeters, reaching 90 centimeters by 2100, threatening Sydney's coastal habitats and infrastructure. It also notes that a 1 centimeter sea-level rise can cause up to 1 meter of erosion on low-lying beaches. The full study is expected to be released in January 2009.

Dubai, Kuwait, and the Nile Delta would be significantly affected by a 1-meter sea level rise, warns Raymond S. Bradley, director of the Climate System Research Centre, suggesting reinforcement measures mainly around Dubai's coastline. [October 2008; Military Implications, Sources[192]]

A study commissioned by the Dutch government recommends that the Netherlands should spend "an extra 1 to 1.5 billion euros per year" to 2100 (representing about 0.3% of the national income) since "The security challenge is urgent: the climate is changing, the sea level rising and river flows increasing while a quarter of dikes and dams do not meet the current safety norms." The report predicts a sea level rise of between 0.65 and 1.3 meters (2.15 and 4.3 feet) by 2100 and up to four meters by 2200.

A team of US scientists concluded that it is very unlikely that sea levels would rise by more than 2m (7ft) by 2100, even if one factored in faster melting and flow of Greenland and Antarctic ice sheets and glaciers. However, paleoclimatologists at the University of Wisconsin-Madison, analyzing the prehistoric Laurentide ice sheet (today's Greenland is an analog of those earlier climatic conditions) say that Greenland could melt faster than estimated based on contemporary trends, raising sea levels 1.3 meters by 2100.

The representatives of four Pacific island nations—Kiribati, the Marshall Islands, Palau, and Micronesia—called on delegates at the General Assembly's annual high-level debate to increase help and adaptation actions. Kiribati's President Anote Tong noted that his country has only several decades before the country's islands become uninhabitable. Tonga's Prime Minister Feleti Vaka'uta Sevele underlined that "climate refugees from some of the Pacific Island Forum countries is no longer a prospect but a reality, with relocations of communities due to sea level rise already taking place."

Cities along the West coast of Africa from Mauritania to Cameroon will be underwater as a result of rising sea levels by the end of the century, environmental experts say. A separate report from South Africa says Cape Town has a one in five chance of severe flooding within 25 years as a result of global warming. [September 2008; Military Implications, Sources[193]]

Sea levels could rise four meters, making some Pacific islands uninhabitable within the next decade, warns Australian expert Will Steffen, head of the climate change unit at the Australian National University and science adviser to the federal Government. Tuvalu might be underwater by 2050. He says that polar ice sheets melting have been underestimated.

West Africa's 4,000-kilometre (2500-mile) coastline—from Senegal to Cameroon— might be dramatically changed by the end of the century due to rising sea levels of up to 2 cm (0.8 inches) per year that will damage fragile coastline strips, especially in low-lying and densely populated deltas. Among the cities worst hit would be the Gambian capital Banjul and Nigeria's economic capital, Lagos, home to 15 million people.

Off the southern coast of Ghana, the ocean is rising steadily, forcing residents to move every few years. However, soon, some villages will have no place left to run, as the available properties are too expensive.

In Britain about 70 landmarks sites around the coastline are threatened by rising seas and coastal erosion, according to the National Trust. [July-August 2008; Military Implications, Sources[194]]

MELTING SEA ICE AND GLACCIERS

Scientific Evidences and Potential Consequences

While it's still too early to say whether the 2009 melt will exceed the record 2007 melt, since the annual low-point is reached in September, the trend line for 2009 shows a lower sea ice coverage, according to the latest data from the National Snow and Ice Data Center.

Uganda's National Environmental Management Authority said that at the present rate, Mount Speke ice cap, the main water source to the neighboring communities, might be melted away by 2023, threatening the livelihoods of the people of Bundibugyo, who rely on agriculture to survive. It will also impact the Nile basin and Lake George and Lake Albert. [June 2009. Military Implications, Sources[196]]

Bolivia's 18,000-year-old Chacaltaya glacier completely melted away this year. Bolivian scientists surveying the glacier since the 1990s predicted that it would survive until 2015. As per the World Bank's estimates, most of the Andes' glaciers will disappear within 20 years.

Temperatures in the Tibetan plateau rose by 0.32ºC every 10 years since 1961—much higher than the average national rise of 0.05º-0.08ºC, thus accelerating glaciers' melting, reports the China Meteorological Bureau. [May 2009. Military Implications, Sources[197]]

Recent evidence of ice loss from both poles renewed the fears that global warming is progressing faster than scientists predicted. The latest evidence from satellite observations from NASA and the National Snow and Ice Data Center show that the decade-long trend of shrinking sea ice cover is continuing, and the ice cap is thinning. Compared to the 1980s and '90s, thicker ice, which lasts two summers or more, decreased to less than 10% of the northern polar ice cap in winter, from 30–40% (and 20% just two years ago), while thinner seasonal sea ice (which melts in summer) now accounts for about 70% of the Arctic total, compared to 40–50%. Similar observations were made by Pen Hadow, the head of a British team walking to the North Pole to assess the Arctic ice sheets melting rate, who found that, so far, the average depth of the ice has been under 1.8 meters (6 feet), suggesting most is new first-year ice that is likely to melt in summer months.

Similar phenomena are happening at the South Pole, where the European Space Agency satellite data show massive amounts of ice are breaking away from the Wilkins Ice Shelf on the western side of the Antarctic Peninsula. [April 2009. Military Implications, Sources[198]]

New evidence shows that the Arctic is warming faster than any other place on Earth. Over the past three decades, the average warming over the Arctic Ocean was 3°C, even reaching 5°C (9°F) in some parts where the ice has been lost, while the average global temperature has risen by less than 1°C (1.8°F). The lakes in Siberia are now five times larger than in 2006, notes Katey Walter, ecologist at the University of Alaska in Fairbanks. She underlines some potential consequences, such as increasing permafrost melting and runaway warming, the growing amount of fresh water flowing into the Arctic Ocean from the melting sea ice, glaciers, and rivers, changing the ocean conveyor current, with consequences on the Asian monsoon and rain patterns affecting food and water supply of a large part of world population.

Considering the rapidly melting ice sheets in Greenland and Antarctica, sea levels might be rising by 1 meter or more by 2100, twice as fast as forecast by the IPCC, said scientists at the Copenhagen environmental conference. [March 2009. Military Implications, Sources[199]]

A glitch in satellite sensors caused underestimation of the extent of Arctic sea ice by 500,000 square kilometers (193,000 square miles) the U.S. National Snow and Ice Data Center said. The error was due to a problem called "sensor drift." The revised data will be available soon.

New evidence shows that the Pyrenees have lost almost 90% of their glacier ice over the past century, and scientists estimate that they might disappear completely within a few decades due to global warning. Other European glaciers seem to have the same fate.

During the International Polar Year (IPY) (covering a two-year period, March 2007-2009), some 160 multi-disciplinary research projects were conducted, involving scientists of more than 60 countries. The findings are summarized in the study *The State of Polar Research* by the UN World Meteorological Organization and the International Council for Science, and a major IPY science conference is planned for Oslo, in June 2010. Although many questions remain, there is consensus that global warming is more intense in the Polar Regions than previously forecasted, and snow and ice are declining in both regions, raising sea levels and changing global ocean and atmospheric circulation, with a wide range of consequences for humans and ecosystems. [February 2009. Military Implications, Sources[200]]

The University of Zurich's World Glacier Monitoring Service published the latest data showing that alpine glaciers from the Andes to Alaska and across the Alps shrank twice as fast as a decade ago, losing on average 0.7 meters of thickness in 2007—the most recent data available. The experts warn that most glaciers will disappear by mid-century.

Synthesis and Assessment Product 1.2: Past Climate Variability and Change in the Arctic and at High Latitudes is a comprehensive synthesis of science literature about the Arctic, integrating research on the past 65 million years of climate change, with contributions from 37 scientists from several countries. The conclusions show that faster warming at the Arctic than other places in the Northern Hemisphere is expected to continue, with all its consequences—sea-ice retreat, rising sea levels, increased erosion, etc. Additionally, human activity might induce changes that would exceed documented natural variability and trigger serious transformations.

Despite earlier beliefs, all of Antarctica seems to be warming, reported climatologists in the article "Warming of the Antarctic ice-sheet surface since the 1957 International Geophysical Year" published in the journal Nature. The conclusions resulted from combining satellite observations over the entire continent with data from land weather stations for the past 50 years. Warming of the continent's western side has been twice as rapid as the East Antarctica. [January 2009. Military Implications, Sources[201]]

Researchers say that the amount of ice flowing out of Greenland this summer is nearly three times more than that lost last year. [December 2008; Military Implications, Sources[202]]

Advanced computer models using new surface temperatures data showed that changes in temperatures at the poles over the 20th century could occur only if greenhouse gas emissions and ozone depletion are factored in. This improved understanding of how the ice sheets will evolve over this century, explained the team of scientists led by East Anglia's Nathan Gillet.
A report by the Dirección General de Aguas de Chile, the country's official water authority, warned that the Echaurren glacier and other smaller glaciers near Santiago could disappear over the next half-century. The Echaurren glacier supplies 70% of Santiago's water needs and is the main source for the Maipo River and its tributaries, the water sources for the region's agriculture.

Water scarcity might cause massive population displacement in central Chile. [November 2008; Military Implications, Sources[203]]

Autumn air temperatures in the Arctic reached a record high this year, 5°C (9°F) above normal, revealed *Arctic Report Card 2008* by U.S. National Oceanic and Atmospheric Administration. The main reason is major loss of sea ice, which allows more solar heating of the ocean, as the region is warming up more rapidly than the rest of the planet. The report also noted that the Arctic Ocean is getting warmer and less salty as sea ice melts; sea level rose nearly 0.1 inch per year, one of the main contributors being Greenland's considerable surface ice melting. According to data from ESA's Envisat satellite, the thickness of sea ice in large parts of the Arctic declined by as much as 19% last winter compared to the previous five winters. WWF's report *Climate change: faster, stronger, sooner* shows that the Arctic Ocean is losing sea ice up to 30 years ahead of IPCC predictions and summer sea ice could completely disappear between 2013 and 2040.

Kolahoi glacier, the only year-round source of fresh water for the Kashmir valley, is melting at an alarming rate and might be all gone in 10 years. As water stress threatens the livelihoods of millions, the perspective of lasting peace in the region disputed by India and Pakistan is becoming even more difficult. [October 2008; Military Implications, Sources[204]]

The Northwest Passage has been ice-free since early August for the second year in a row and it's the first year that both the Northwest Passage over the top of North America and Russia's Northeast Passage are free of ice. Although the ice is the second lowest (after last year's record), the US National Snow and Ice Data Center (NSIDC) says "some climate modelers expect to see nothing but open water within five years." This is corroborated by Canadian scientists who report that Canada's Arctic ice shelves are disappearing at an incredibly high rate. The greatest changes are occurring at the highest northern latitudes; this summer alone, five ice shelves along the northern Ellesmere Island had shrunk by 23%.

The report Global Glacier Changes: Facts and Figures by UNEP and the World Glacier Monitoring Service is a comprehensive analysis of the fluctuations of glaciers and ice caps worldwide and presents the overall trend of glaciers' retreat. The report underlines that while excellent data exist for Europe and North America, monitoring should urgently improve for "some strategically important regions" as the Tropics, Central Asia and the Polar Regions, where data gaps undermine the ability to provide early warning and plan preparedness accordingly. According to initial calculations, Greenland has lost 150 billion tons of ice a year in the last four years. The Danish–American project GNET is part of a scientific observation network for monitoring and providing estimates on Greenland's ice cap melting rate.

A Spanish research study has revealed that Pyrenean glaciers might disappear by 2050. Glaciological calculations have shown that since 1990 rapid melting has caused total regression of the smallest glaciers and 50%-60% of the surface area of the largest glaciers.

Satellite images revealed that the Karakoram-Himalayan glaciers have been retreating at around 110 meters a year over the period 1978 to 2006 compared to the 30 to 34 meters previously reported. Among human activities that have caused the retreat are listed intense military activities at the Siachen Glacier region, along with dumping of chemical and human waste. The Karakoram-Himalayan glaciers are headwaters for Asia's nine largest rivers, including the Indus, Ganges, Mekong, Yangtze and Yellow rivers. [September 2008; Military Implications, Sources[205]]

Experts at the World Water Week conference held in Stockholm warned of the rapid glacial melting and dramatic changes in rainfall in the world's mountainous regions. Himalayan glaciers are retreating the most rapidly, said Mats Eriksson, of the International Centre for Integrated Mountain Development. Stretching across China, India, Nepal, Pakistan, Myanmar, Bhutan and Afghanistan, the Himalayas range constitutes a major source of water for some of the most populous parts of the planet.
Arctic Ocean sea ice might set another record low this summer, according to scientists at the National Snow and Ice Data Center, and to ESA's Envisat satellite observations. The direct route through the Northwest Passage became almost free of ice, while the Amundsen Northwest Passage has been passable since July. [July-August 2008; Military Implications, Sources[206]]

FOOD AND FRESHWATER

Food and Freshwater Scarcity Issues

(Listed by month in reverse chronological order)

FAO announced that the number of world hungry is projected to reach a historic high of 1,020 million people in 2009. The most recent increase is not the consequence of poor global harvests but is caused by the world economic crisis which resulted in lower incomes and increased unemployment undermining access to food. The majority of those most affected live in areas with already high environmental and conflict vulnerability. The final version of *State of Food Insecurity in the World* will be released in October.

By mid-century, climate change may have outrun the ability of Africa's farmers to adapt to rising temperatures, threatening the continent's precarious food security. Growing seasons throughout nearly all of Africa in 2050 will likely be hotter than any year in historical experience, and even the hardiest varieties of the continent's three main crops – maize, millet and sorghum – would probably not tolerate the conditions. The six most affected nations will probably be Senegal, Chad, Mali, Burkina Faso, Niger, and Sierra Leone. However, the situation might get worse, as the study, published in the *Global Environmental Change* journal, is based on IPCC's mid-range projection, which is considered an underestimate.

The OECD and FAO released an advance summary of the *Agricultural Outlook 2009-2018* that addresses, among other issues, the interdependence between food and energy markets and the possible impacts of expanding demand for biofuels on agricultural commodity prices. It highlights that oil prices above US$90 per barrel would imply significantly higher food prices.

During the past 50 years, freshwater flow dropped up to 14% for some of the major rivers feeding the Pacific and Indian Oceans, mainly due to changing precipitation patterns linked to climate change, according to research by the National Center for Atmospheric Research.

The *Rising Temperatures, Rising Tensions; Climate change and the risk of violent conflict in the Middle East* report [see above item '7.2 Threats and Strategies for Addressing Climate Change in the Middle-East'] specifically warns about potential increasing armed conflict in the Middle East over control of water resources. The report refers to expert opinions that even under the present condition of moderate global warming, by 2100, the Euphrates (which runs through Turkey, Syria and Iraq) might shrink by 30%, the Jordan River by 80%, while the Dead Sea is shrinking by 1 meter per year due to overuse of its tributaries, and climate change. The study

notes that Israel's National Communication warned that water supply may fall by 60% of 2000 levels by the end of the century. [June 2009. Military Implications, Sources[209]]

The 17th session of the Commission on Sustainable Development held May, 4-15, 2009, focused on the interdependence and the role of agriculture and climate change. The meeting's final agreement calls for some urgent policies such as: developing and implementing comprehensive strategies for dealing with climate change, drought, desertification and natural disaster; sustainable management of water and land resources; sustainable agriculture; and providing secure access to food and social safety nets. The CSD's decisions will be forwarded for consideration by the July 2009 meeting of the Economic and Social Council.

For addressing their food and water security, several food-importing countries including China, South Korea, Saudi Arabia, and the UAE, have started buying or leasing land in poor countries in Africa, Latin America, Central Asia, and Southeast Asia, for producing food. The International Food Policy Research Institute, that conducted the study at the request of the UN, estimates that 2.5 million hectares (about 20% of all EU farmland) in poor countries have been subject to transactions or talks involving foreigners since 2004, in deals estimated to worth $20 billion-$30 billion, which is at least 10 times as much as an emergency package for agriculture recently announced by the World Bank and 15 times more than the American administration's new fund for food security. Some of the countries involved are Sudan—the recipient of the largest food-aid operation in the world, and Pakistan, which is promising Gulf investors a security force of 100,000 to protect the assets. Left unchecked, this trend could further exacerbate the turmoil in the food market and potentially lead to conflicts over land and food. As glaciers in the Andes are melting away, tensions are rising between those living upstream and downstream, small farmers and agribusinesses, and even among states. As per the World Bank's estimates, most of the Andes' glaciers will disappear within 20 years, threatening the water supplies of nearly 80 million people, and jeopardizing energy security in Bolivia, Ecuador and Peru, which depend on hydropower for about half their electricity. [May 2009. Military Implications, Sources[210]]

The First G8 Agriculture Ministers' Meeting, held in Cison di Valmarino, Italy, April 18–20, under the theme "The World Food Emergency," was attended by Ministers of Agriculture of the G8 countries and Brazil, China, India, Mexico, South Africa, Argentina, Australia and Egypt, and the heads of UN agencies. The Declaration adopted includes proposals to place agriculture and food security at the core of the international agenda and sustainably increase renewable energy production from biomass without compromising food security. The Declaration will be forwarded to the G8 Heads of State summit to be held in Italy in July 2009.

Delegates attending the 65th Session of the UN Economic and Social Commission for Asia and the Pacific (UNESCAP) held in Bangkok, Thailand, April 23-29, discussed the financial crisis and its convergence with other threats to development and the need to work toward a stable and supportive financial system for development. The meeting was convened under the theme of "Sustainable Agriculture and Food Security in Asia and the Pacific" with the special body on least developed and land locked developing countries addressing the food-fuel-financial crisis and climate change, and associated threats to development.

Rivers in some of the world's most populated regions are losing water due largely to climate change, reveals research led by scientists from the National Center for Atmospheric Research (NCAR) in Boulder, Colo., to be published May 15 in the American Meteorological Society's

Journal of Climate. Among the 925 big rivers, rivers with decreased flow outnumbered those with increased flow by 2.5 to 1 and freshwater discharges into the Pacific Ocean and Indian Ocean dropped by 6% and 3% respectively over the past 50 years (from 1948 to 2004). Added to the effects from damming, irrigation, and other water use, these changes could become a threat to future supplies of food and water, warn the researchers.

The "Asia's Next Challenge: Securing the Region's Water Future" report produced by the Asia Society, warns that Asia may see more conflicts over scarce water resources in the coming years due to the combination of climate change, urbanization, and population growth. Most vulnerable are the relations between India and Pakistan, and those related to the Mekong River, which is shared by China and its southern neighbors, Myanmar, Laos, Thailand, Cambodia and Vietnam. The ten recommendations put forward in the report include greater regional cooperation and ensuring that water management organizations work directly with those responsible for defense and diplomacy. [April 2009. Military Implications, Sources[211]]

"Water in a Changing World," the 3rd World Water Development Report, notes that by 2050 population would reach 9.1 billion if fertility rate continues to decrease, while if it would stay at the present level of 2.56, the population would reach 11 billion, consequently increasing demand for food and water in both cases. Over the last 50 years, freshwater withdrawals have tripled and irrigation doubled due to population growth. The report also made the link between poverty and water resources, noting that "The number of people living on less than $1.25 a day coincides approximately with the number of those without access to safe drinking water."

Population growth to 8.3 billion by 2030 will increase food and energy demand by 50% and fresh water by 30%, said John Beddington, chair of a new UK Cabinet Office task force set up to address food security, at the Sustainable Development UK 09 conference. Underlining a belief that climate change will be an exacerbating factor, he suggested swift policy measures to improve agriculture and consumption practices. For addressing the situation at the European level, he proposed the creation of a position of chief science adviser to the European Commission.

A new report by the Institute for Agriculture and Trade Policy (IATP), calls for a global shift from the industrial model of agriculture toward sustainable practices. The recommendations include an international rights-based approach that ensures water availability for ecosystems and people and harmonization of policy approaches to water, agriculture and climate.

At the annual UNIS-UN conference on "The Food Crisis: A Global Challenge", held March 5-6, 2009, UN Secretary-General Ban Ki-moon discussed the linkages between food security and climate change and stated that helping communities around the world adapt to climate change will be a key issue at the UN Climate Change Conference in December 2009.

The Water and Disaster Action Plan, prepared under the auspices of the Secretary-General's Advisory Board on Water and Sanitation, provides a tool for the UN System to mobilize and coordinate its efforts in assisting member States to face the challenge of natural disasters. It was launched at the fifth World Water Forum, held in Istanbul, Turkey, March 16-22, 2009

The First Ministerial Forum on Water of the Group of 77, held February 23-25, in Muscat, Oman, concluded with the adoption of the Muscat Declaration on Water, which suggests the recognition of human right to clean water and sanitation as a key goal. Ministers in charge of water recommended the promotion of innovative technologies among developing countries to address the negative impacts of water-related disasters.

On World Water Day, the Executive Secretary of the UN Convention to Combat Desertification (UNCCD), Luc Gnacadja, called for prudent water management to halt land degradation and its consequences, including conflict over scarce resources.

"The Roadmap to End Hunger" report prepared by more than 30 organizations, calls for the US to boost spending on food and agricultural aid by 60% in 2010 to $6.36 billion, and commit to further increases to $13.31 billion by 2014. Other recommendations include: a strengthened emergency response to better address short-term hunger needs; more flexible safety nets to mitigate the impacts of shocks on vulnerable populations; improved nutrition programs to ensure that people in the developing world have access to the nourishment needed to lead healthy lives; and expanded programs to enhance the productivity of smallholder farmers, which is critical in addressing chronic hunger. New bipartisan legislation expected to be unveiled in the coming weeks incorporates key recommendations of the Roadmap.

Gender inequality has amplified the impact of the financial, food and climate crises on African women, said Isatou Njie-Saidy, Vice-President of Gambia, at the 53rd session of the Commission on the Status of Women, held on March 4. The panel organized by The UN Economic Commission for Africa (UNECA) and the UN Development Fund for Women (UNIFEM) called on the international community to promote gender-specific plans and programs to help women better address these crises. [March 2009. Military Implications, Sources[212]]

"The Environmental Food Crisis: The environment's role in averting future food crises" report by UNEP warns that 25% of the world's food production might be lost by 2050 due to environmental breakdown. In the meantime, over half of the food produced today is lost, wasted, or discarded as a result of inefficient food chain management. In addition, the share of the world's cereals used for animal feed is projected to increase from a third today to a half by 2050. With the global population expected to continue increasing, world food prices might rise by 30-50% over the coming decades. The report proposes seven goals for reducing food insecurity, ranging from short-term price issues to long-term global warming measures.

The High-level Meeting on Food Security for All, held from January 26-27, 2009, in Madrid, Spain, issued a statement that calls for a consultative process on options for a Global Partnership for Agriculture Food Security and Nutrition. At a roundtable meeting on disaster, risk reduction, and climate change in Nairobi, held February 20th, Kenya's Prime Minister Raila Odinga underlined that climate change is a threat to food security and could dampen efforts aimed at tackling poverty in Africa unless urgent steps are taken to address it.

Hundreds of millions of South Asians face growing water stress due to over exploitation, climate change, and inadequate cooperation among countries. All three factors are threatening river basins that sustain about half of the region's 1.5 billion people, warns the report "Freshwater Under Threat: South Asia" by UNEP and the Asian Institute of Technology. South Asia is home to 25% of the global population but has access to less than 5% of the world's freshwater resources. The report calls for urgent policy attention and more research into the impact of climate change on water resources, infrastructure, and management practices, as well as improved cooperation among the affected countries and integrated basin management. China declared a drought emergency and earmarked Rmb400m (US$58.5m) for relief. The agriculture ministry says water shortages are affecting up to 43% of the country's wheat-producing area and around 3.7m people.

A new study published in *Fish and Fisheries* warns climate change threatens the livelihood of millions of people in fishery-dependent nations. The study identifies 33 countries of high vulnerability, 19 of which are already in the UN "least developed" category. The countries listed as most vulnerable are: Malawi, Guinea, Senegal, Uganda, Bangladesh, Cambodia, Pakistan, Yemen, Peru, and Colombia.

"The World's Water 2008-2009 Biennial Report on Fresh Water Resources" states that providing clean water and proper sanitation to the poorest billions is directly related to governance and commitment to the task, not money or lack of available transport and technology. Discussing "Peak Water," Peter Gleick notes that although water is a renewable resource—and therefore we should never completely run out of it—increasing population and agricultural needs might drain the non-renewable aquifers. Some recommendations include improving water-use efficiency; accurate water pricing; updating the Clean Water Act and the Safe Drinking Water Act to include new contaminants, actively enforcing the standards already in place, and strengthening water institutions.

The 10th session of the Human Rights Council to be held March 2-27, 2009, in Geneva, will consider a report by the High Commissioner for Human Rights on the relationship between climate change and human rights such as right to safe and adequate water and food, health, and housing. The report was produced in consultation with member States and relevant actors, including IPCC and UNFCCC. [February 2009. Military Implications, Sources[213]]

Half the world's population might face food crises by 2100, warns a team of scientists from Stanford University's Program on Food Security and the Environment. The main cause is a combination of climate change and water shortage, reducing crop yields in the tropical and subtropical regions (between about 35° north latitude and 35° south latitude) where the world's fastest-growing and poorest populations are. They suggest rethinking the whole agricultural system in view of the new environmental and demographic trends.

The number of hungry people increased by 40 million in 2008, said FAO, but $30 billion a year investment in infrastructure and agricultural production could eliminate the root causes of hunger by 2025. This represents only 8% of the support to agriculture by OECD countries. In sub-Saharan Africa only 4% of the arable land is irrigated (compared to 38% in Asia), and only 3% of renewable water reserves are used.

Before the high level meeting, "Food Security for All," held in Madrid, January 26-27, the ETC Group released a *Communiqué* on global governance of food and agriculture. It suggests that the four main agencies (FAO, CGIAR, IFAD, WFP) should coordinate and work together along with smaller more specialized organizations from the developing countries.

The UK created a new Food and Environment Research Agency (FERA) by merging several Defra agencies and thus better integrating food and environmental security research and policy.

Indonesia's rice production was very good in 2008, but inefficient implementation of land reforms and improvement of economic conditions of farmers led to numerous conflicts.

Two-thirds of the Tibetan plateau glaciers might be gone by 2050 if the current temperatures rise continues, note scientists. Water shortages would affect 2 billion people in China, India, Pakistan, Bangladesh, and Bhutan.

In Africa, by 2020, water shortages might affect 250 million people, and agricultural productivity could decline 50%. These points were stated at the two-day meeting organized by the UN Office for the Coordination of Humanitarian Affairs (OCHA) and the African Union

(AU), aimed at developing a continent-wide policy framework to protect pastoralists in Africa. [January 2009. Military Implications, Sources[214]]

FAO's *Crop Prospects and Food Situation* report warns that some 33 countries around the world are in need of external food assistance as a result of crop failures, conflict or other forms of food insecurity and high domestic food prices. Although cereal harvests in 2008 reached record highs, with wheat and rice production at over 2 billion tons—more than a 5% rise over 2007, most increases were achieved in richer nations.

Martin Parry, former co-chair of an Intergovernmental Panel on Climate Change (IPCC) working group and lead author of its 2007 report, calculated that the more the year of greenhouse gas emissions reduction is delayed, the higher will be the negative impact on food and water supply, health, coastal areas, and other ecosystems. His study reveals that even in the best-case scenario, 1.7 billion people will face water shortage due to climate change already taking place. This could potentially reach 3.2 billion, if action is delayed. Similarly, crop productivity will be affected through more frequent and more severe droughts, floods, and storms.

In Africa, as 21 countries are affected by food crises, governments should double the percentage of national budgets allocated to increase farm output, improve water sharing, and adopt policies to adapt to climate change, agreed ministers attending a water conference in Libya. Africa's population of 967 million, of whom 53% are under the age of 20, is forecast to reach 2 billion in 2050. The UNDP Poverty and Environment Initiative implemented in Malawi and other 10 African countries aims to address food security by including environmental objectives such as combating soil erosion, deforestation, and water pollution in development programs.

Low Carbon, High Growth: Latin American Responses to Climate Change estimates that without adequate actions, climate change might reduce farm revenues by 12%–50% by 2100. *Climate Change and Food Security in Pacific Island Countries*, a report by FAO, the Secretariat of the Pacific Regional Environment Programme, and the University of the South Pacific, notes that the region's food security is seriously affected by natural disasters. Therefore, says Alexander Müller, FAO Assistant Director-General, Natural Resources Management and Environment Department, "integrating climate change adaptation into national policies, strategies, programmes and budgets related to agriculture, forestry and fisheries should become a major priority." In the Solomon Islands, food security and livelihood of villagers of Luaniua and Pelau, are already affected by continuous tidal surge onto the land, reports the Ministry of Home Affairs and the National Disaster Management Office.

The UK set up the Council of Food Policy Advisers in order to address the growing concern of food security and find strategies to feed the world's growing population. Professor Lang, member of the newly formed Council, lists "new fundamentals" that will shape future food production, including: oil and energy price volatility; water scarcity, through auditing foods' water requirements; biodiversity replacement and enhancement by changing practices of land use and food growing; urbanization; and complete use of produce independently of appearance.

Global warming and melting of Tibetan glaciers might produce 15 million "environmental refugees" in South Asia and conflicts within Punjab and Sindh, warns Simi Kamal, member of the Stockholm-based Global Water Partnership Technical Committee, adding that water distribution is political in nature and needs to be resolved in order to avoid conflict. [December 2008; Military Implications, Sources[215]]

About 960 million were malnourished and over 100 million people worldwide were driven into poverty this year due to the food and fuel crisis. The World Bank warns that the situation will continue to get worse as unemployment rates rise, commodity prices remain volatile, and governments face shortages in public money and outside financial assistance. The financial crisis is eclipsing and aggravating the food crisis. Production is threatened by: farmers' increasingly difficult access to credit, high input costs, and a growing monopoly over seed and agrochemical sales.

"The impact of natural resource degradation is potentially even more devastating in financial terms than the current global meltdown," said Christian Mersmann, Managing Director of the Global Mechanism of the UN Convention to Combat Desertification, at the seventh session of the Committee for the Review of the Implementation of the Convention. Some 12 million hectares of land are lost yearly due to degradation and environmental causes. Desertification threatens regions that are already the most vulnerable: 65% of agricultural lands in Africa—where 60% of the population depends on agriculture, and nearly 70% of the Arab region.

Countries still strongly affected by food crises include Kenya (where officials have been accused of artificially creating a maize shortage), Zimbabwe (where the political impasse has only made the situation worse), Afghanistan (where attacks on food convoys amplify food insecurity), Swaziland (threatened by another year of drought), Haiti (where 26 children have died in just four weeks from malnutrition), Bangladesh (where broken dams have flooded 13 Khulna villages), North Korea (where there are signs of massive malnutrition despite efforts to hide the evidence), West Africa (where the UN is seeking US$361 million to solve the crisis), and the horn of Africa (with 12 million hungry in Ethiopia, 3 million in Somalia, 2 million in Kenya and Uganda, plus more in Eritrea and Djibouti).

In Latin America, the UN Economic Commission for Latin America and the Caribbean (ECLAC) projects that 10 to 15 million more people could slip below the poverty line in 2008 as a result of food price volatility.

Experts reiterated that half the world will face water shortages by 2080, with Asia being the most affected due to its large population, melting of Himalayan glaciers, and low-lying costal areas. Southeastern U.S. states are being advised to diversify their water supplies in expectation of a drier future climate. In Australia's Murray-Darling Basin, irrigated agriculture could be halved by 2050; and in the Sahel region, an estimated 110 million people might be affected by Niger's seasonal flooding decrease due to changes in rainfall patterns and human exploitation. [November 2008; Military Implications, Sources[216]]

The food crisis continues in many countries, particularly in North Korea, Somalia, and Zimbabwe, where the situations have been called humanitarian crises. Hunger in Latin America has risen from 45 million in 2006 to 51 million today. Chinese experts warn that the country's food production might drop by 23% by 2050 due to climate change.

World Food Day focused increased attention on the seriousness of the situation, but much attention is diverted by the financial crisis. The credit crisis is aggravating the food crisis as countries like China institute new export taxes to keep their crops and fertilizers in the country, causing the costs of these goods to rise elsewhere. New trade agreements, like the Thailand and Iran barter of oil for rice, reveal new types of reaction to the fluctuating prices of commodities. Leaders worldwide are calling for action on the food crisis, such as the Asia-Europe Meeting recommending coordinated action between Europe and Asia. A new council was set up in Britain to look at food security.

Middle East water scarcity-related issues are aggravated as the Sea of Galilee, Israel's largest freshwater lake, vanishes, threatening the livelihoods of local communities. About 50% of Israel's drinking water comes from the lake, water is already rationed, and its agricultural use is increasingly reduced, jeopardizing food production.
In Bangladesh, drinking water becomes saline as rising sea levels force salt water further inland. In Zimbabwe, the conflict situation over water has started, as some communities' local rivers are drying up. [October 2008; Military Implications, Sources[217]]

The World Bank warns that the global food crises will be long-term as climate change, energy, and water scarcity intensify. In Africa, 100 million people are at risk of moving back into poverty. The International Water Management Institute (IWMI) argues that the world is facing not so much a food crisis as a water crisis, which might intensify, as water is likely to get scarcer due to global warming and increased demand. [September 2008; Military Implications, Sources[218]

The food crisis continues to deteriorate. Malnutrition in India will get worse as the country may lose up to 17% of its farming income due to climate change. India and Cambodia are promoting the use of rat meat to offset the food crisis. Bangladesh might lose some 30% of its food production by 2050. The island of Mindanao in the Philippines may experience a food crisis as internal conflict forces displacement of many. Tropical storms in Haiti such as Fay worsen the food crisis, triggering new protests. UN agencies say that 50% of Somalia will be totally dependent on food aid and emergency assistance over the next year. UNICEF says that food shortage might affect up to 70% of rural population in the south, with one in six children suffering from acute malnutrition. South Africa might have its maize crop reduced by 20% within 15 to 20 years as drought worsens in the west, while the east is increasingly afflicted by severe storms.
Three successive years of drought in the West Bank and restraint on movement brought some 50,000 Bedouins and herders to the brink of emergency, says the International Committee of the Red Cross, which helps them face an acute water shortage. This is aggravating Palestinian frustrations over the control of water resources in the Israeli-occupied West Bank. In Afghanistan, though, the food crises might help the government and international community efforts in encouraging the replacement of poppy crops with food crops, tackling both the drug trade and the food crisis.
Meantime, UNCTAD notes that while the world tends to address the urgent humanitarian aspects of global food crisis, attention should be focused on the structure of trade and development policy that underlies the crisis. Similarly, some analysis papers state that the world is producing enough to feed its population, but one of the major problems behind the food crisis is that as much as half of all food grown is lost or wasted (which means also wasted water). A policy brief, "Saving Water: From Field to Fork – Curbing Losses and Wastage in the Food Chain" produced by FAO, the International Water Management Institute, and the Stockholm International Water Institute, calls on all actors in society to reduce food waste by half, by 2025. [July-August 2008; Military Implications, Sources[219]]

Water-related Rights and Security Addressed by 5th World Water Forum

The 5th World Water Forum was held in Istanbul, March 16-22, 2009, under the framework "bridging divides for water." Several theme and regional sessions addressed water resources,

security implications and risk management in the context of global change—mainly the effects of climate change and the economic crises. There was consensus that the main drivers of the increasing global demand for water are population growth, mobility, changing living standards, and growing energy demand that might increase hydropower and biofuels production. Some suggestions made at the Forum include: constitution of a "World Water Parliament" (proposed by a Brazilian official); stricter zoning laws; linking water and energy efficiency initiatives; reiteration of need for effective early warning systems and focus on adaptation strategies and developing bottom-up approaches as part of a proactive (rather than reactive) policy processes for addressing disasters and reducing water-related conflicts; financing for improving access to water (it was said that $1 invested in water and sanitation saves $4-$12 in health and social costs); including water issues in the governing principles to avoid water-related conflict; and the need to respect international law protecting water resources during conflict.

The global water policy debate was around the implications of designating access to clean water as a fundamental human right. The Ministerial Declaration adopted by the Forum includes commitments to recognize water as a basic human need, but there was large support for the human right status and some participants suggested that the issue be further discussed under the auspices of the UN to produce binding rules on the right to water and sanitation. The statement delivered by Maude Barlow, Senior Advisor on Water to the UN General Assembly President Miguel d'Escoto stipulated that "Water is a public trust, a common heritage of people and nature, and a fundamental human right," and suggested that since, "the present World Water Forum does not share the widely held views against water privatization and on preventing water from becoming a commodity … future Forums should adopt international norms and conduct their deliberations under the auspices of the United Nations. I urge UN Member States to work together to promote policies for a Forum that meets our well-developed methodologies for such events. These policies should be implemented before the meeting of the Sixth World Water Forum."

Other reports launched at the Forum include the 3rd World Water Development Report (WWDR-3), "Water in a Changing World," and "Managing Water for All: An OECD Perspective on Pricing and Financing by OECD." [March 2009. Military Implications, Sources[220]]

Central Asian Water Security Tensions Continue

The Central Asian water summit held on April 28 at Almaty, Kazakhstan, gathered the Presidents of all five Central Asian states (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan) to discuss activities of the International Fund for Saving the Aral Sea. When the contentious cross-border water sharing issues came up, tensions arose between upstream Kyrgyzstan and Tajikistan, who want to build power stations to address energy shortages in their countries, and downstream Kazakhstan, Turkmenistan, and Uzbekistan, which need large quantities of water for their economic activities. No agreement was reached and the final statement mentions only the issues related to the decline of the Aral Sea. Since the Soviet Union's cross-border water distribution system fell apart, the lack of a regional transboundary water management agreement became the most serious Central Asian security concern. Therefore, the international community should intensify such efforts as those started at the Fifth Ministerial Conference, "Environment for Europe", held in Kiev in 2003 to develop a Central Asian Initiative on environment, water and security. [See also *Unless Water Management Improves, Conflicts over Water Are Inevitable* in August 2006, *A Project to Address the Aral Sea*

Disaster in February 2005, *Network of Environment Centres in Central Asia* in February 2004, and *First EU-Central Asia Security Forum Included Environmental Security* in September 2008 environmental security reports.] [April 2009. Military Implications, Sources[221]]

Addressing Potential Business-related Water Scarcity Issues

Water Scarcity & Climate Change: Growing Risks for Businesses & Investors report by the Pacific Institute at the request of Ceres (national network of investors, environmental organizations and other public interest groups working with companies and investors to address sustainability challenges such as global climate change) addresses the impact of climate change and business practices on water and the potential consequences of water scarcity to businesses. The report also explores the role of investment strategies to mitigate harmful impacts. Using information from over 100 companies, the report identifies water-related risks specific to eight key sectors such as energy, mining, and computer technology, and offers a framework to calculate and address industries' "water footprints". [March 2009. Military Implications, Sources[222]]

Forums Discussing Water-Related Security Issues

The conference Water for Peace – Peace for Water: Lessons from the Past and Current Challenges, jointly organized by the UNESCO International Hydrological Programme (IHP), the Chirac Foundation, and the French Agency for Development, addressed two issues: transboundary water and cooperation, and access to water in fragile states. The outcomes [to be available at http://www.fondationchirac.eu/en/water-for-peace-and-peace-for-water-november-13/] will be considered in the Political Process of the Fifth World Water Forum, to be held in Istanbul, March 15-22, 2009.

The International Conference on Water Resources and Arid Environment and the First Arab Water Forum took place in Riyadh, Saudi Arabia, November 16-19, 2008 and addressed challenges related to water resources in the area and strategies to address them, including new technologies and Arab water policies for development and water crisis management. In his opening address, Prince Khalid bin Sultan bin Abdulaziz warned of possible terrorism targeting water resources and called for a water summit similar to the world economic summits. [See also *Unless Water Management Improves, Conflicts over Water Are Inevitable* in August 2006 and other related items in previous environmental security reports.] [November 2008. Military Implications, Sources[223]]

Global Plan to Address Freshwater Supplies Negotiated

In preparation for the 5th World Water Forum to be held in March 2009 in Istanbul, senior officials from more than 60 countries met in Rome, January 21-23, to negotiate a global plan of action for addressing issues of freshwater resources and improving water governance. Industrial and agricultural use, growing population, pollution of ground and underground reservoirs, and effects of climate change all reduce the amount of clean water available and threaten water security. The Rome meeting is expected to negotiate a Ministerial Statement to be adopted by the Ministerial Conference at the World Water Forum. [The outcomes of the meeting were not available at the time of this writing.] Meanwhile, addressing the meeting "Managing our Future Water Needs" held in Davos, UN Secretary-General Ban Ki-moon underlined, "The problem is that we have no coordinated global management authority in the UN system or the world at

large. There is no overall responsibility, accountability or vision for how to address the related problems of climate change, agricultural stress and water technology." [See also *Unless Water Management Improves, Conflicts over Water Are Inevitable* in August 2006 and other related items in previous environmental security reports.] [January 2009. Military Implications, Sources[224]]

HEALTH

Nationwide Health Information Network Could Help in Environmental Emergencies

According to information from Indiana University, "Investigators from the Regenstrief Institute [on the campus of Indiana University's School of Medicine in Indianapolis] have led a demonstration of how health information exchange technologies developed and tested regionally can be used to securely share patient information across the nation during an emergency." The demo was based on the HHS-supported trial implementation of a Nationwide Health Information Network (NHIN). [September 2008; Military Implications, Sources [225]]

International Response to Contain Influenza A(H1N1) Outbreak

The World Health Organization raised the level of influenza A(H1N1) alert to five on a one to six scale, meaning that it considers a pandemic highly probable. All countries are asked to activate their pandemic plans and be prepared to deal with emergency situations. The flu—a combination of swine, bird, and human viruses—started in Mexico and rapidly spread around the world, with cases confirmed in 11 countries, as of the end of April. WHO flu expert Dr Keiji Fukuda said, "Containment is not a feasible operation." In response to the outbreak, WHO has applied the International Health Regulations 2005 that entered into force in 2007 for all member states. Some experts consider that the influenza A(H1N1) will test IHR 2005's efficiency and countries' compliance, as well as provide an opportunity for increased preparedness for eventual future acts of bioterrorism and expedite research for a vaccine that would protect against a larger spectrum of viruses. The Saint Louis University Center for Vaccine Development announced that the development of a universal flu vaccine is getting closer to reality. [See also *Global Pandemic Containment Efforts* in October 2006 environmental security report.] [April 2009. Military Implications, Sources[226]]

Global Influenza Pandemic Declared

The World Health Organization raised the level of influenza A(H1N1) alert to Phase 6, which indicates that a global pandemic is underway and further spread of the virus is 'inevitable.' According to the latest figures from the WHO, there have been 263 deaths and nearly 60,000 cases in some 100 countries and territories. [June 2009. Military Implications, Sources[227]]

Health-related Climate Change Consequences, Trends, and Actions

Climate change is the biggest global health threat of the 21st century, warns Professor Anthony Costello, co-author of the article "Managing the health effects of climate change" published in *The Lancet*. The article outlines the global health implications of a range of climate

change projections from the optimistic average global temperature rise of 2°C to the catastrophic 6°C, considering a wide range of pathways through which climate change could impact human health. Professor Costello proposes three action points emerging from this report: add health experts to the mitigation debate; address the massive inequality in health systems around the world; and develop win–win situations so that mitigation and adaptation to climate change strategies also improve human health and well-being. [May 2009. Military Implications, Sources[229]]

At the 62nd World Health Assembly, held May 18-22, 2009, in Geneva, Switzerland, member States unanimously agreed to the resolution and work plan for scaling up the WHO's technical assistance to countries for assessing and addressing the implications of climate change for health and health systems. The work plan is organized around four objectives: advocacy and awareness raising; engagement in partnerships with other UN organizations and sectors to ensure that health issues are included in adaptation and mitigation policies; supporting the generation of scientific evidence; and strengthening health systems to cope with the threats posed by climate change.

The UNFCCC Secretariat posted the submission by WHO, which will be examined in the 6th session of the Ad Hoc Groups on Long-Term Cooperative Action in Bonn, Germany, to be held June 1-12, 2009. The paper, "Protecting the health of vulnerable people from the humanitarian consequences of climate change and climate related disasters" is based on the recognition that climate change mitigation and adaptation are important for protecting the health of vulnerable populations and aims to document the range of risks that climate change poses to human health associated with humanitarian emergencies.

WHO also launched a report, "Protecting Health from Climate Change: Global research priorities," during the meeting of Commonwealth Health Ministers held in Geneva, Switzerland. The report, based on a global e-consultation and meeting of over 70 leading experts, proposes a series of recommendations on the most important directions for future work in five research areas: assessing risks, identifying the most effective interventions, guiding health-promoting mitigation and adaptation decisions in other sectors, improving decision-support, and estimating the costs of protecting health from climate change. [May 2009. Military Implications, Sources[230]]

At the ceremony on World Health Day, April 7, Michel Jerraud, Secretary-General of WMO, noted the need for early warning systems for climate hazards. Margaret Chan, Director-General of WHO, discussed the need for long-term planning, especially for those areas that will become disaster-prone due to climate change, and also made connections between climate change and needs to ensure disaster-related health care. [April 2009. Military Implications, Sources[231]]

Changes in rainfall patterns and rapid urbanization increase dengue fever outbreaks in Asian countries such as Indonesia, said an official of the World Health Organization Southeast Asia.

A study published in the journal Environmental Health Perspectives notes that higher temperatures, humidity and rainfall associated with climate change have led to increased outbreaks of West Nile Virus infections across the United States in recent years. The authors warn that the pattern will only get worse in coming decades with increased economic and health burdens.

At the international scientific congress "Climate Change: Global Risks, Challenges and Decisions," from 10-12 March 2009, in Copenhagen, Denmark, WHO noted the uneven distribution of health impacts of climate change globally, identifying populations in small island developing States, mountainous regions, large urban areas, coastal areas, and areas that lack access to water among the most vulnerable. WHO estimates that around 150,000 deaths (85% of them young children) occur in low-income countries each year due to malnutrition, diarrhea, malaria, and flooding as effects of climate change alone.

On World Water Day, March 22nd, UNEP highlighted the potential benefits of investing in the world's freshwaters, including the potential benefits to the global economic recovery and to accelerating a response to climate change. According to UNEP, the market for supply, sanitation, and water efficiency is expected to be nearly US$660 billion by 2020, and that global economic benefits of US$38 billion annually could be reaped from investing US$15 billion annually in halving by 2015 the number of people without sustainable access to safe water and basic sanitation. [March 2009. Military Implications, Sources[232]]

WHO approved a five-year work plan on climate change and health. The work plan aims to enhance capacity for monitoring and assessment. It will also seek strategies and activities that can protect health, especially that of the most vulnerable; and promote the sharing of knowledge with the following four objectives: advocacy and awareness raising; partnership building with other UN organizations and sectors; promotion and support for the generation of scientific evidence; and strengthening health systems to contend with climate impacts.

Jointly with the EU, WHO will conduct assessments of health security and crisis management to enhance the adaptive capacity of EU countries to manage health crises. In addition to topics such as chemical safety and disaster preparedness planning and response, country reports include sections on climate change. Assessments are underway in Armenia, Azerbaijan, Belarus, Georgia, Israel, Moldova, and Ukraine.

Climate change will be one of the main topics on the agenda at the Fifth Ministerial Conference on Environment and Health, scheduled for 2010 in Parma, Italy. The agenda includes children's environmental health and climate impacts related to inequality, gender and stakeholder participation, among others. WHO and EU are also expected to propose a European strategy on health and climate change that follows the 2008 World Health Assembly's Resolution 61.19 (call for protecting health from climate change), as well as recommendations that were developed during several European meetings held in 2007-2008 on the topic. [February 2009. Military Implications, Sources[233]]

ENERGY SECURITY

New International Renewable Energy Agency Opens in January

The International Renewable Energy Agency (IRENA) will be established January 26th in Bonn, Germany, as an intergovernmental organization to promote renewable energy worldwide. It will assist member countries in matters of technology transfer, assessment and dissemination of information on new technologies and best practices, and will help support projects related to renewable energy and tackling global warming. All interested UN member states are invited to become members of IRENA at the Founding Conference in January. The Japanese government declined to join, stating that the agency's functions overlap those of the International Energy

Agency. The organization was initially promoted by Denmark, Germany, and Spain, with strong support from other countries. [December 2008. Military Implications, Sources[235]]

Energy and Environmental Security Increasingly Addressed Together

Chinese officials and U.S. Secretary of State Hillary Clinton agreed to join efforts in addressing the world economic crisis and environmental and security issues. The two countries would cooperate on "clean energy" technology that would include such elements as carbon capture and sequestration, and the smart grid.

Some Canadian think tanks related to the oil industry suggest the creation of a North Pacific Energy Security Framework that would include six countries that share geographic proximity and account for 54% of world energy demand: Canada and Russia—two of the world's top oil and gas producers and exporters; and the US, China, Japan, and South Korea—among the world's top energy consumers. The pact would address issues related to developing Arctic resources, investment in energy and energy trade, and climate change.

The proposed new U.S. Energy Efficiency Resource Standard (EERS) legislation would require electric and gas utilities to reduce demand by 15% and 10% respectively, by 2020, by increasing energy efficiency. The Obama administration is also considering introducing national rules for regulating greenhouse gas emissions for automobiles, to achieve an average of 35 miles per gallon by 2020. (California's proposed standard is about 42 mpg.) [See also *European Energy Security Strategies* in January 2009, *North American Environmental Security Action Plan* in June 2008 and other related items in previous environmental security reports.] [February 2009. Military Implications, Sources[236]]

An International Energy and Environmental Security Foresight Network

The Energy and Environmental Security Ecosystem (EESE) is a project initiated by the U.S. Energy Department's intelligence and counterintelligence unit, for compiling and sharing intelligence and improving understanding of possible security implications of energy and environmental security issues. It will involve a coalition of countries and will consist of a members-only website for selected government, industry and expert representatives, and eventual face-to-face meetings. "The character of the energy and environmental security challenge requires a radically different, more globally systemic process," says a report by Natural Resources Canada, mentioning the EESE project. Countries involved or interested include Australia, Bangladesh, Brazil Canada, China, France, Germany, India, Italy, the Netherlands, Sweden and the U.S. Others may join later. The project is to be launched in the first half of 2009. [November 2008. Military Implications, Sources[237]]

Suggestions for Addressing Energy and National Security

The article "Energy Security as National Security: Defining Problems Ahead of Solutions" analyzes the link between energy and national security looking at military and domestic vulnerabilities and economic issues, and suggesting some strategies. The article warns about the danger that associating energy issues with national security to the point of using "military power or the language of security diplomacy" might have negative effects on energy security itself. The suggestions include: improving systemic resiliency of critical infrastructures; reducing energy price volatility by maintaining a climate of non-violence and adequate investment in energy sources; and sharing security information and intelligence cooperation for increasing

transparency. The article is part of the February 2009 issue of the Journal of Energy Security, a good source of information and analysis in this area. [February 2009. Military Implications, Source[238]]

World Energy Outlook 2008

World Energy Outlook 2008 is the authoritative report on energy prospects. The WEO-2008 provides new energy projections to 2030 by regions and fuel types. It focuses on the two sectors that it considers the most pressing today: oil and gas production, including future global oil and gas supply and post-2012 climate scenarios, including possible outcomes of the international negotiations and carbon schemes and implications for global energy markets. [November 2008. Military Implications, Source[239]]

PREVENTION AND ADAPTATION

UN and Governments of Latin America and the Caribbean Met to Improve Disaster Anticipation and Response System

The First Regional Meeting on Enhancing International Humanitarian Partnerships for Latin America and the Caribbean was held in Mexico City, September 10-11, hosted by the Government of Mexico in collaboration with the Government of Canada and the United Nations Office for the Coordination of Humanitarian Affairs (OCHA). Participants explored how to improve disaster preparedness and response information and coordination systems among national and regional governments and relief organizations. As a first step, it is "essential to establish the basic compatibility of national response systems with the international system, tools and mechanisms," said John Holmes, Under-Secretary-General for Humanitarian Affairs and UN Emergency Relief Coordinator. The next regional meeting will be held in Brazil, in 2009. [September 2008; Military Implications, Sources[241]]

Conference on Resilience Concepts for Large-Scale Disasters

Applications of chaos theory, self-organization, wisdom of the crowds, and other concepts of how to achieve unity of effort in conditions where there is no unity of command in humanitarian assistance and disaster management associated with large-scale social crisis and global change will be discussed at the U.S. Resilience Summit 2008 to be held at the Cosmos Club, 2121 Massachusetts Ave, N.W., Washington, D.C. October 23rd. The meeting is intended to lead to an international summit in 2009; however, some UN and other international participation is expected. According to Michael D. McDonald, President, Global Health Initiatives, Inc. and coordinator for the Resilience Summit, lessons will be drawn from disasters such as Hurricanes Katrina and Ike, the Pakistani earthquake, the Indian Ocean Basin Tsunami, and Cyclone Nargis. Anticipating needs for emerging situations such as in the Philippines, North Korea, Darfur, Somalia, Zimbabwe, Eritrea, Northern Baja California, Nigeria, Mexico City, and US inner cities will also be explored. [September 2008; Military Implications, Sources[242]]

Regional Initiatives

The second session of the Global Platform for Disaster Risk Reduction, held June 16-19, 2009 in Geneva, Switzerland, concluded with a call to halve disaster-related deaths by 2015. Other specific targets identified include: by 2010, the establishment of clear national and international financial commitments to disaster risk reduction (DRR), for example to allocate a minimum of 10% of all humanitarian and reconstruction funding, at least 1% of development funding, and at least 30% of climate change adaptation funding to DRR; and by 2015, all major cities in disaster-prone areas to include and enforce DRR measures.

The Scientific and Technical Advisory Panel of the Global Environment Facility recommended that all mitigation projects and also, as appropriate, GEF strategies should incorporate climate adaptation measures and promote mitigation-adaptation synergies. It also advised that the GEF should consider the whole landscape approach regarding natural resource and chemicals life cycle management, and that it critically apply risk assessment to its proposed actions in order to maximize resilience to climate change while investing in mitigation.

The Zambezi River Basin Initiative (ZRBI) launched by The International Federation of Red Cross and Red Crescent Societies is an adaptation project focusing on disaster preparedness rather than post-emergency relief operations. About 80% of the region's 32 million people depend on agriculture and fishing. It is a joint program among seven southern African countries: Angola, Botswana, Malawi, Mozambique, Namibia, Zambia, and Zimbabwe, combining risk reduction efforts with food security, health, HIV prevention, and capacity building activities.

Gordon Brown says that developed nations should create a $100 billion per year fund to help developing nations cope with the effects of global warming. This is less than the 1% of developed countries' GDP that the G77 group has suggested. Brown's suggestion still needs to be endorsed by the EU-bloc before it could be put forward at the Copenhagen negotiations. [June 2009. Military Implications, Sources[244]]

During the 17th session of CSD, UNEP launched a new report, "The Environmental Food Crisis: The Environment's Role in Averting Future Food Crises," which provides an overview of how environmental stresses such as climate change, water stress, invasive pests and land degradation may impact food prices and world food security. The report stresses the need for a Green Revolution in Africa, noting the challenges of water scarcity, lack of infrastructure and impacts from climate change, and proposes a seven-point plan to reduce the risk of hunger and food insecurity in the 21st century. At the launch, UNEP Executive Director Achim Steiner stated that reversing environmental degradation and investing in ecological infrastructure such as forests, soils, and water bodies is part of the Green Economy solution. He also pointed to opportunities to diversify livelihoods and incomes via the emerging carbon markets, including renewable energy and income from conserving forest, soil and vegetation cover to sequester carbon. [May 2009. Military Implications, Sources[245]]

The European Commission presented a White Paper outlining the framework for reducing the European Union's vulnerability to the impacts of climate change. Since the impacts of climate change vary by region, the strategy would complement Member States' policies through an integrated and coordinated approach, particularly in cross-border issues. It underlines that adapting to climate change should be integrated into all EU policies. The plan has two phases: the first one spans 2009-2012 for preparing the knowledge base and policy instruments for phase

two, commencing in 2013, that would be the implementation of the adaptation strategy. The White Paper covers phase 1, which is based on "four pillars of action" covering increasing understanding of climate change and identifying actions and policy instruments to be embedded in key EU policies. The paper specifies that a Clearing House Mechanism should be established by 2011 to exchange information on climate change impacts and adaptability measures. The Commission will set up an Impact and Adaptation Steering Group to ensure the successful completion of phase 1. The Commission also presented three discussion papers on water, coasts and marine, and agricultural and health issues based on the framework set out in the White Paper.

UN Deputy Secretary-General Asha-Rose Migiro highlighted links between the issues of gender, disaster risk reduction, climate change, and poverty reduction in a statement delivered to the International Conference on Gender and Disaster Risk Reduction, from 20-22 April, in Beijing, China. Migiro stressed that women, who constitute 70% of the world's poor, are disproportionately impacted by disasters and warned that climate change is expected to exacerbate this suffering, as well as threaten food security, health, and water supplies. She called for a "21st Century multi-stakeholder partnership" to mitigate the growing scourge of disasters.

Nearly 500 indigenous representatives from 5,000 distinct indigenous groups across 80 nations gathered for the Indigenous People's Global Summit on Climate Change, hosted by the Inuit Circumpolar Council, April 20-24, in Anchorage, Alaska, to discuss how to integrate indigenous views, policies, traditional values and visions into the global response to the challenges of climate change. The Summit's final recommendations contain two options regarding the use of fossil fuels: the first calls for a moratorium on new oil and gas drilling, while the second proposes an eventual phase-out of fossil fuels use, while at the same time respecting the rights of indigenous people to develop their resources. The recommendations will be presented to COP15. [April 2009. Military Implications, Sources[246]]

NATO's "New Horizons" report emphasizes that energy and environmental standards should be considered in security-related reconstruction and stabilization activities (e.g., levees, earthquake-proof housing, improved agricultural practices, and alternative energy systems), as well as better information sharing to assess future needs of individual communities/countries.

The first-ever meeting of the Committee on Disaster Risk Reduction of the UN Economic and Social Commission for Asia and the Pacific (ESCAP) was held March 25-27, 2009, gathering more than 200 delegates including ministers and senior officials from 25 countries of the most disaster-prone region, to discuss the creation of Disaster Risk Reduction strategies. The Asia-Pacific region accounts for 42% of the world's natural disasters, and 65% of their victims. Noeleen Heyzer, UN Under-Secretary-General and ESCAP Executive Secretary, announced that ESCAP would establish a regional platform for sharing information among disaster risk management authorities. ESCAP will also produce the Asia-Pacific Disaster Report, which will synthesize information from member States, provide assessment of the disaster risk reduction in the region and identify future priorities and trends.

The UN Human Settlements Programme (UN-HABITAT) launched the Cities and Climate Change Initiative (CCCI) at a conference titled "Cities and Climate Change," on March 17 in Oslo, Norway. The initiative focuses on mitigation and adaptation to climate change impacts on human settlements within the framework of urban governance, decentralization, strengthening local authorities, and environmental planning and management. The conference also marked the launch of pilot projects to help Maputo in Mozambique, Kampala in Uganda, Sorsogon City in the Philippines, and Esmeraldas in Ecuador to adapt to climate change by redesigning

infrastructure. The results of the deliberations will be forwarded to the Copenhagen climate change conference in December 2009. [March 2009. Military Implications, Sources[247]]

The Ecosystems and Livelihoods Adaptation Network (ELAN) is being created as a platform for sharing information globally and to be a resource linking scientists with managers and decision-makers to help some of the most vulnerable ecosystems and societies cope with the impacts of global climate change. It is a collaboration between the International Union for the Conservation of Nature and WWF International.

Although about $18 billion were pledged by the world's richest countries to help poorer ones adapt to climate change, less than $1 billion has been disbursed. The Global Environment Facility distributed $760 million over the past three years, but about 33% of that went to China, India, and Brazil, while the 49 poorest countries received less than $100 million.

At the Pacific ICT Ministerial Forum, "Connecting the Unconnected," in Nukualofa, Tonga, from 17-20 February 2009, organized by the International Telecommunication Union, 13 ministers from Pacific Island Countries issued a joint communiqué calling for, *inter alia*: greater coordination among partners to minimize overlap and maximize the impact of investments in ICT development projects; the rapid implementation of regional connectivity initiatives; reinforced efforts to build human capacity in ICT; and making full use of ICTs for early warning and response systems to improve disaster preparedness. [February 2009. Military Implications, Sources[248]]

The Least Developed Countries Fund, established under the UNFCCC and managed by the Global Environment Facility to help the poorest countries implement urgent projects to adapt to climate change, might need $1 billion, said Boni Biagini, who runs the fund. So far, only $172 million was pledged to the fund. Nevertheless, the Central Emergency Response Fund, set up in 2006 to help in case of natural and man-made disasters, has surpassed its annual target, reaching $452.5 million, with some of the 101 contributing nations significantly increasing their donations for 2009, announced the UN Office for the Coordination of Humanitarian Affairs. Meanwhile, at the Poznan climate change conference, it was agreed that the board of the Kyoto Protocol's Adaptation Fund would have the legal capacity to grant developing countries direct access to about $60 million to help them cope with the effects of global warming. However, the suggestion by some delegates to increase from 2% to 3% the share of proceeds from the Clean Development Mechanism that finances the Adaptation Fund was rejected. The UN estimates that $86 billion per year might be needed by 2015 for poor countries to adapt to global warming, while some aid groups are calling for at least $50 billion.

At the Third Asian Ministerial Conference on Disaster Risk Reduction held in Kuala Lumpur, Malaysia, government officials from more than 40 Asian countries discussed partnerships and regional cooperation for disaster preparedness and early warning systems. The Asia-Pacific region is the most populous and also most affected by disasters in terms of human and economic impacts, according to the UN International Strategy for Disaster Reduction. Greater investment in disaster risk reduction is crucial for the region's development and to reduce relief costs, since studies show that $1 invested in disaster preparedness saves between $4 and $7 in humanitarian relief and reconstruction costs after a disaster happens.

The UN Disaster Assessment and Coordination (UNDAC) organized disaster-awareness training programs in Russia for members of the Commonwealth of Independent States and in the Middle East. In 2009 it will do so in the West African region. All countries, which join the

system, must receive the training. Since its inception in 1993, UNDAC has deployed 183 missions to assist countries affected by disasters. [December 2008. Military Implications, Sources[249]]

Indonesia launched a sophisticated new tsunami warning system that runs a computer-simulated model and can predict waves' arrival times and heights, enabling fast emergency measures. Although it will take some more years to cover all the coastal regions, the construction of the system is ahead of the 2010 completion target and was able to predict the tidal wave that struck the Sumatran coast in September.

An 'adaptation scan' developed by Tauw and BuildDesk of the Netherlands could help policymakers assess the effects of climate change in their respective areas. It operates using complex combinations of two databases—one with effects and the other with measures, and generates several direct and indirect possible consequences.

Preparations of coastal communities for addressing possible natural disasters are increasing across the globe. The UK has commissioned a study on towns vulnerable to flooding. California is starting a series of adaptation efforts including moving a highway farther inland and constructing flood-resistant buildings. An Alaska village is planning to move their entire community due to rising sea levels. The coasts of New Jersey and New York City have to prepare to be radically altered by 2100. The Netherlands is considering a proposal to build islands off the coast like barrier reefs to deal with rising waters. Australia and Indonesia are in talks to create a center to prepare the region to deal with natural disasters. The coasts of Bangladesh, and of Gujarat in India, are already changing and, as a result, some families are moving. The EU pledged to provide technical and financial assistance to Pacific nations affected by climate change.

The sixteenth Asia-Pacific Economic Cooperation (APEC) forum adopted a declaration to enhance cooperation for improving risk reduction, preparedness, and management to fight climate change, including building domestic disaster management capabilities. [November 2008. Military Implications, Sources[250]]

CLIMATE MODELING

Climate Projection Models

MIT Integrated Global Systems Model, a comprehensive computer simulation including global economic activity and climate processes, involving 400 runs with slight variations of parameters, revealed—compared to 2000, a median probability of surface warming of 5.2ºC (9.4ºF) by 2100, with a 90% probability of 3.5º-7.4ºC (6.3º-13.3ºF). A 2003 median projection was a warming of 2.4ºC (4.3ºF). However, the estimates might be understatements, as they don't include positive feedbacks from phenomena like methane release as consequence of arctic permafrost melting. The model was run and illustrated for situations with and without "policy change" for curbing greenhouse gas emissions. [May 2009; Military Implications, Sources[252]]

A computer model by the Institute of Mechanical Engineers in Britain shows that over the next 40 years, even if CO_2 emissions continue to grow at the current rate (1.9% annual average), global temperatures will still rise 2°C relative to the pre-industrial age. The computer model also predicts that by the end of the first decade of the 22nd century, atmospheric CO_2 would be 4 times

the pre-industrial level—even with a decreasing rate of emissions, and by 3000 almost all of Greenland's ice would be melted and Atlantic ocean circulation would be fundamentally changed. [February 2009; Military Implications, Sources[253]]

Four models by the Met Office Hadley Centre on climate projections show the possible range of temperature rise by 2100 as a function of actions in greenhouse gas emissions. While all models show that some global warming by the end of the century is inevitable because of the CO_2 already in the atmosphere, they outline the direct dependency of temperatures rise on actions to cut emissions. The most optimistic scenario shows global temperature rise of 2–2.8°C with the condition that actions start in 2010 and emissions decrease 47% by 2050 at a sustained rate of 3% per year. In the worst-case (no action) scenario, temperatures could rise by 5.5–7.1°C, with significant and irreversible impacts. The two middle-case scenarios, based on slow emissions reductions, show possible temperature rises of 2.9–3.8ºC in the case of actions starting in 2010, and 4–5.2ºC if action is delayed until 2030. [December 2008; Military Implications, Sources[254]]

The Center for a New American Security gathered some 40 climate scientists and experts in security, environmental policy, and business from Asia, Europe and the U.S. for a "war game" involving global warming. Four teams, representing China, Europe, India, and the U.S, had to negotiate the best deal for their team, in the case of a scenario set in 2015. The climate simulation up to 2100, based on the worst-case scenario proposed by the IPCC, was provided by the Oak Ridge National Laboratory in Tennessee. The three-day exercise confirmed the difficulties of such negotiations and might have pinpointed some specific aspects that should be considered in real situations.

The new NCAR Front Range Flash Flood Prediction System being tested by the National Center for Atmospheric Research (NCAR) in Boulder CO provides advance notice of potentially deadly flash floods. According to the announcement, the system integrates real-time weather information with datasets about hydrology and terrain. These datasets incorporate information about land surface conditions, such as terrain slope, soil composition and surface vegetation. They also include information on stream flow and channel conditions. The goal of the system is to furnish a 30-minute or longer warning of a flood.

New computer modeling shows that changes of the Atlantic Thermohaline Circulation (ATHC) due to melting glaciers and sea ice could influence the sea surface temperature changes in the Gulf of Guinea, thus possibly causing African Monsoon failures, resulting in up to 60% rainfall reduction and intensifying drought. The effect is estimated to be felt in less than a decade, with more drastic consequences predicted for the 25-35 years after the onset of increased freshwater additions to the ocean resulting in a rapidly weakened ATHC. The authors suggest monitoring the ATHC's changes and effects on the climate in the tropical Atlantic. [July-August 2008; Military Implications, Sources[255]]

C. Protecting the Environment Due to Its Inherent Moral Value [256]

ENVIRONMENTAL SECURITY-RELATED INTERNATIONAL REGULATIONS THAT HAVE BEEN OR ARE CLOSE TO COMING INTO FORCE SINCE JULY 2008

AQUATIC ENVIRONMENT

Marine Environment

New International Agreement on Recycling of Ships

The International Convention for the Safe and Environmentally Sound Recycling of Ships was adopted at the International Convention held in Hong Kong, May 11-15, 2009. The new Convention covers all phases of a ship's life and operation, from design to dismantling in an environmentally and safe manner, and the establishment of an enforcement mechanism. It also requires all vessels to maintain records of hazardous materials, for workers to be equipped with protective gear, and for recycling centers to have disposal procedures for hazardous materials. The Convention will be open for signature from September 1, 2009 to August 31, 2010 and for accession thereafter; it will enter into force 24 months after ratification by 15 States representing 40% of world merchant shipping by gross tonnage. [May 2009. Military Implications, Sources[259]]

Tougher Global Limits Imposed on Air Pollution from Large Ships

The Marine Environment Protection Committee (MEPC) of the IMO adopted regulations to reduce harmful air emissions from large ships. The revised MARPOL Annex VI Regulations for the Prevention of Air Pollution from Ships sets progressive reduction in emissions of sulphur oxide (SOx), nitrogen oxide (NOx), and particulate matter from ships. By 2020, ships will be required to use fuel with no more than 5,000 ppm sulfur, a 90% reduction from today's global cap. The revised Annex VI, and the associated NOx Technical Code, will enter into force on July 1st, 2010, under the tacit acceptance amendment procedure. MARPOL Annex VI entered into force in May 2005 and has, so far, been ratified by 53 countries, representing 82 % of the gross tonnage of the world's merchant shipping fleet. [See also *Concerns over Maritime Air Pollution Increase* in February 2008 environmental security report.] [October 2008. Military Implications, Sources[260]]

UN Convention on the Protection of the Underwater Cultural Heritage will Enter into Force in January 2009

The Convention on the Protection of the Underwater Cultural Heritage will enter into force on January 2, 2009, three months after 20 States ratified it. "This represents an essential addition to UNESCO's standard-setting apparatus" declared Koïchiro Matsuura, Director-General of UNESCO. The Convention aims to curb the destruction of underwater cultural heritage and its

Annex details the rules for activities directed at underwater sites. [October 2008. Military Implications, Sources[261]]

Coral Triangle May Get Regional Protection

The six Asian countries (Indonesia, Malaysia, the Philippines, Papua New Guinea, the Solomon Islands and East Timor) that border the "Coral Triangle" have been discussing measures for additional safeguarding of that fragile region against pollution and other hazards. The US has pledged nearly $40 million to support these efforts. [See also *Micronesian Nations Sign Coral Reef Protection Document* in September 2007 environmental security report.] [October 2008. Military Implications, Source[262]]

World Database on Marine Protected Areas

The World Database on Marine Protected Areas is a new online system designed to provide up-to-date information on marine protected areas and marine and coastal ecosystems. It is a tool that would help decision-makers, conservation organizations, and communities around the world to enforce marine protected areas conservation and management. Note: marine protected areas represent less than 1% of earth's surface, while terrestrial protected areas are about 12%.[Items on similar issues in previous environmental security reports: *"Roving" Marine Protected Areas as Climate Change Affects Migration* in March 2008.] [June 2009. Military Implications, Sources[263]]

Chemicals and other Hazardous Compounds

Stockholm Convention Updated with Nine New Chemicals

The 4th Conference of the Parties (COP4) to the Stockholm Convention on Persistent Organic Pollutants (POPs) held May 4-8, 2009, in Geneva, adopted 33 decisions including: listing nine new chemicals for elimination (in addition to the 12 already listed); implementation plans; and improved evaluation mechanisms. No agreement was reached on non-compliance mechanisms, with further discussion to be continued at COP5. Of the nine new chemicals listed under the Convention, some are banned with no exemptions for production or use: alphaHCH, beta hexachlorocyclohexane, HBB, chlordecone, and pentachlorobenzene (PeCB), while others have some specific exemptions: perfluorooctane sulfonic acid (PFOS), tetrabromodiphenyl ether and pentabromodiphenyl ether (c-pentaBDE), hexabromodiphenyl ether and heptabromodiphenyl ether (C-octaBDE), and Lindane. Exceptional use of DDT was approved in the fight against malaria until effective alternatives are found. [See also *New Compounds Considered under the Stockholm and Rotterdam Conventions* in October 2008.] [May 2009. Military Implications, Sources[265]]

EU Legislation Banning Mercury Exports in Effect in 2011

Legislation banning all exports of mercury from the European Union takes effect in March 2011. The EU is the world's biggest exporter, responsible for about 25% of the global mercury supply. The export ban is part of the EU's strategy for reducing the global supply of mercury and thereby addressing mercury pollution globally. [See also *Progress on Global Mercury Ban* in February

2007 and other previous environmental security reports on this issue.] [October 2008. Military Implication, Sources[266]]

EU Updates the REACH System, and WEEE and RoHS Directives

The EU Member States agreed to align EU legislation on classification, labeling and packaging of substances and mixtures to the UN Globally Harmonized System, as part of a global effort to protect humans and the environment from hazardous effects of chemicals. The new regulation will complement the EU REACH system, which is already in force.
The European Commission proposed a revision of the Waste Electric and Electronic Equipment (WEEE) directives and restrictions on: the use of certain hazardous substances in electrical and electronic equipment (RoHS) for greater coherence with other EU regulations (such as the labeling system, the waste framework, and REACH), easier implementation and enforcement, and higher but more flexible targets. Concerning the WEEE directive, the current collection target of 4 kg per person per year would be replaced by a mandatory collection target equal to 65% of the average weight of electrical and electronic equipment placed on the market over the two previous years in each Member State. [See also *EC Enforces Compliance of National Legislation with EU Environmental Regulations* in October 2007 and other related items in previous environmental security reports.] [December 2008. Military Implications, Sources[267]]

Canada Increases Chemicals Control

Ontario has joined Quebec in enacting restrictions on the use of pesticides and is going further by prohibiting the sale and cosmetic use of more than 80 ingredients and 250 products. Other provinces are considering similar measures. Ontario also proposed the Toxics Reduction Act, 2009, aiming to reduce the use of toxic and hazardous substances in manufacturing and industrial operations. If enacted, the directive will bring Ontario manufacturing into compliance with the EU REACH regulations. [See also *Canada Extends Toxic Substances Lists* in March 2009 and *New Chemicals Considered for Toxic Lists* in January 2009 environmental security reports.] [April 2009. Military Implications, Sources[268]]

India to Enact Regulation Curbing Plastic Bags Use

India's regulation to curb plastic bags gets increased enforcement by the decision of the city of Delhi to outlaw the, "use, storage and sale", of all polyethylene bags, and apply severe penalties for non-compliance. The law is effective immediately, and applies to customers and retailers alike, but the first target is manufacturers, to restrict availability. India thus joins other countries that have introduced similar regulations. [See also *Restrictions on Plastic Bags Expanding* in January 2008 and other related items in previous environmental security reports.] [January 2009. Military Implications, Sources[269]]

Forests Management

Rights of Forest Peoples Need to Be Observed in Anti-deforestation Efforts

Research from the Rights and Resources Initiative, announced at the Rights, Forests and Climate Change conference in Oslo, has now shown that the financial costs of setting up legal rights for forest-dwelling peoples are around $3.35 per hectare compared with the estimated costs for

elements of the UN-proposed Reduced Emissions from Deforestation and Forest Degradation (REDD) program ($800 to $3500 per hectare each year for the next 22 years), but can make a large difference in the efforts aimed at reducing deforestation. Ignoring these rights can cause serious problems for the efforts, and full advantage should be taken of those peoples' well-informed help in protecting what is, after all, their environment. The IUCN's World Conservation Congress also endorsed the REDD "as long as it remains just and equitable." [See also *International Alliance of Forest Peoples* in April 2008 and other related items in previous environmental security reports.] [October 2008. Military Implications, Sources[271]]

Waste Management

EU Batteries Directive Entered into Force

The EU Batteries Directive entered fully into force across the EU on September 26, 2008. It requires waste batteries to be properly collected and recycled by producers and users. [See also *Waste Management Policies* in June 2008 and other related items in previous environmental security reports.] [October 2008. Military Implications, Source[272]]

PROPOSED TREATIES AND/OR CHANGES TO EXISTING ONES

Aquatic Environment

A New Step Toward Preventing Water Wars

Falling water tables around the world increase the likelihood that abuse of international groundwater aquifers will cause conflicts. The International Law Commission adopted draft articles for the first international framework convention on transboundary groundwater aquifers. The articles cover issues related to utilization of transboundary aquifers; activities that have or are likely to have an impact on aquifers; and measures for the protection, preservation, and management of transboundary aquifers. The draft articles create a framework and set of principles for further negotiations to eventually create a binding convention. The articles are compatible with but independent from the UN Convention on the Non-Navigational Uses of International Watercourses (UN Watercourses Convention), and hence, not dependent upon its ratification. The UN Watercourses Convention was adopted in 1997 (with only China, Turkey, and Burundi voting against) and has 16 of the 35 required ratifications to go into force. At the 2008 World Water Week held in Stockholm, the WWF called upon states to support the Convention's entry into force as a way to prevent future possible conflicts due to competition over water resources. [July-August 2008; Military Implications, Sources[275]]

Draft Agreement for Management of International Aquifers

The draft Convention on Transboundary Aquifers aims to create a framework for proper management and exploitation of underground water resources, calling on States to cooperate on aquifers' use and to prevent and control their pollution. Aquifers contain 100 times the volume of surface fresh water, but are largely not covered by international regulations despite their

transboundary conditions, and their great environmental, social, economic and strategic importance. The new Convention would apply to 96% of the planet's freshwater resources. It was prepared by the UN International Law Commission and experts from UNESCO's International Hydrological Programme, and submitted to the UN General Assembly on October 27, 2008. The same day, UNESCO published the first detailed map of 273 underground transboundary aquifers, including information about the water's quality and rate of replenishment. [October 2008. Military Implications, Sources[276]]

"Roving" Marine Protected Areas as Climate Change Affects Migration

Climate change affects weather patterns, ocean currents, and temperatures, which affect ecosystems and animals' migration; hence, areas set aside for wildlife protection may have to change as well. None of the over 4,500 marine protected areas worldwide have been designed factoring in climate change, say experts. Hence, scientists are speculating about possibilities of drawing "roving" protected areas as a function of changing conditions. Although technical advancements facilitate the task of identifying ecosystem changes, the issues of governance might be a greater challenge. The current 0.7% of the world's oceans being designated as protected is far from the 20% to 30% by 2012 goal declared at the 5th World Parks Congress in 2003. [See also *Marine Protection to Increase* in June 2008 and other similar items in previous environmental security reports.] [March 2009. Military Implications, Source[277]]

U.S. and Canada to Control Air Emissions from Ships

The U.S. and Canada have proposed that the International Maritime Organization create a North American Emission Control Area around their coastlines, extending out 200 nautical miles in the jurisdictions of the United States and Canada. In order to comply with the new standards, ships should use fuel with a maximum of 1,000 parts per million sulfur beginning in 2015, and new ships should use advanced emission control technologies beginning in 2016. The proposal is part of a comprehensive EPA program to address harmful emissions from ships under the National Clean Diesel Campaign and the Clean Ports Program, in an effort to protect the population from harmful emissions. The IMO is expected to begin reviewing the proposal in July, with expected approval in 2010. [See also *Tougher Global Limits Imposed on Air Pollution from Large Ships* in October 2008 environmental security report.] [April 2009. Military Implications, Sources[278]]

Measures Needed to Quiet Underwater Noise

The UNEP Convention on Migratory Species conference held in Rome noted that human activities are making the marine environment noisier, as well as more acidic. The report Ocean Noise: Turn it Down by the International Fund for Animal Welfare states that low frequency underwater noise has doubled every 10 years over the past 50 years, and the number of ships has tripled and is expected to double again by 2025. An alliance of wildlife groups warned that this is disturbing marine mammals that use sound to communicate and navigate and called upon governments to adopt regulations that impose quieter off-shore equipment and ship engines and less intrusive sonar technologies by navies. The EU submitted a draft resolution suggesting a wide range of measures, including noise protection areas, better monitoring of noise levels, databases with noise origins, and a set of guidelines for better managing noise sources.
In the meantime, a three-year lawsuit against the U.S. Navy by environmental groups concerning the Navy's use of sonar in oceans has been settled in a California court, requiring more extended

research on the effects of sonar on whales and other marine mammals. (Note: this is a separate case from the November 2008 U.S. Supreme Court ruling that lifts restrictions on the Navy's use of sonar off the coast of California.) [See also *U.S. Supreme Court Rules in Favor of Navy in Sonar Case* in November 2008 and other previous environmental security reports on this issue.] [December 2008. Military Implications, Sources[279]]

Growing Marine Litter Increasingly Threatens Marine Ecosystems

Plastic debris, along with rubbish and other waste, are littering the marine environment worldwide, revealed Marine Litter: A Global Challenge, a report launched on World Oceans Day by UNEP and Ocean Conservancy, analyzing 12 major regional marine ecosystems around the world. Studies indicate that plastic content rose considerably in ocean animals from North Sea fulmars, to Northeast Atlantic plankton. UNEP suggests several strategies to curb marine litter, including improved waste management, shipping and port regulations on waste discharge, a modified system of fines for ocean dumping, improved ship dismantling, and a ban on thin film plastic bags. Out of the 12 regional seas included in the report—Baltic Sea, Black Sea, Caspian Sea, East Asian seas, East African seas, Mediterranean, Northeast Atlantic, Northwest Pacific, Red Sea and Gulf of Aden, South Asian seas, South Pacific, and Wider Caribbean—the East Asian Seas seem to be in the worst situation. [Items on similar issues in previous environmental security reports: *Microplastics Recognized as Environmental Threat to Oceans* in November 2008, and *International Conference and Assessments Find Rising Ocean Pollution* in October 2006.] [June 2009. Military Implications, Sources[280]]

Chemical and Biological Safety

Chemical and Biosecurity Issues

Reportedly, the al-Qaeda cell that shut down operations in the Tizi Ouzou province in Algeria after an accident might have been developing chemical and biological weapons. Last year, it was reported that allegedly up to 100 potential terrorists had attempted to enter postgraduate programs in Britain to gain access to laboratories. Experts and security organs repeatedly warn that the security measures to stop eventual development and use of such weapons by terrorist groups are insufficient and inadequate.

Six-legged Soldiers: Using Insects as Weapons of War by Jeffrey A Lockwood warns about the possibility of terrorists developing an insect-based weapon and conducting a biological attack more easily than a chemical or nuclear strike. He therefore urges governments to create an effective "pest management infrastructure" able to detect insects carrying a deadly disease. Countries with inadequate safety standards for pharmaceutical and food production combined with insufficient import verification mechanisms open a new avenue for terrorist activity. In an increasingly globalized world with greater access to S&T knowledge and software, international standards, information-sharing agreements, common ground for cooperation with the local authorities, improved inspections and testing systems, and stronger and more comprehensive import safety regulations (especially for pharmaceutical and food production) are needed. [See also *Better International Controls Needed to Prevent Bioterrorism* in July 2006, *Call for Reinforcements to Chemical Safety* in September 2006, and other items on this theme in previous environmental security reports.] [January 2009. Military Implications, Sources[282]]

Dangers Increase from "Amateur" Genetic Engineering; the Biological Weapons Convention to be Updated

Scientists from the Vanderbilt Medical Center and the University of North Carolina at Chapel Hill have used genetic engineering techniques to produce a new SARS-like virus affecting bats and transmittable to mice, in order to study such transferences. Some scientists believe these kinds of experiments might trigger new biosecurity problems. "Garage" bioengineering development ("synthetic biology") could be done by amateur scientists. The required knowledge is now widely available and affordable equipment is easy to obtain. So far no instances of terrorists exploiting this field have been reported. Another possibility is the accidental release of harmful new organisms into the environment by well-intentioned amateur experimenters.
In the meantime, the annual session of States parties to the Biological Weapons Convention reiterated the need to improve biosafety and biosecurity, increase awareness, and develop codes of conduct for preventing the misuse of bioscience and biotechnology research. The Convention may be updated at the next review conference to be held in 2011 to cover potential new threats. After the meeting, Russia announced that it backs a legally binding mechanism for enforcing the Biological Weapons Convention. [See also *ETC Report Warns of the Threat of Synthetic Biology and Calls for Global Regulations* in January 2007 and other items in previous environmental security reports on this theme.] [December 2008. Military Implications, Sources[283]]

Research Labs Safety Questioned

The World Health Organization is investigating allegations that the influenza H1N1 (swine flu) virus might have arisen and been released into the environment as an accidental happening at a biological research laboratory or vaccine production facility. However, the U.S. Centers for Disease Control and Prevention is skeptical. Meantime, a Canadian researcher was caught at the border trying to smuggle 22 vials with genetic material linked to the Ebola virus from Winnipeg's National Microbiology Laboratory into the U.S. [See also *Dangers Increase from "Amateur" Genetic Engineering; the Biological Weapons Convention to be Updated* in December 2008 and other items in previous environmental security reports on this theme.] [May 2009. Military Implications, Source[284]]

New Chemicals Considered for Toxic Lists

Several more persistent organic pollutants may be banned or restricted under the Stockholm Convention. In addition to five substances already short-listed in 2007, the fourth meeting of the Persistent Organic Pollutants Review Committee (COP-4) approved four chemicals to be listed under Annexes A, B, or C: commercial octabromodiphenyl ether (c-octaBDE), pentachlorobenzene (PeCB), and alpha- and beta-hexachlorocyclohexane (alphaHCH and betaHCH), and suggested further evaluation for endosulfan and hexabromocyclododecane (HBCD) to be listed under the Convention. [See also *New Chemicals Proposed to be Added to Stockholm Convention on POPs* in May 2005, and other related items in previous environmental security reports.]

The fourth meeting of the Conference of the Parties to the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (PIC COP-4) agreed on the inclusion of tributyltin compounds in Annex III of the Rotterdam Convention but did not reach consensus on the inclusion of chrysotile asbestos

and endosulfan to the trade "watch list". Delegates also discussed implementation issues and cooperation among the Rotterdam, Basel and Stockholm Conventions. [See also *UN E-Waste Forum and Basel Convention's Conference of Parties* in December 2006 and other related items in previous environmental security reports.] [October 2008. Military Implications, Sources[285]]

Health Canada and Environment Canada are recommending adding diethyl sulphate to the country's list of toxic substances. The compound is used in the production of fabric softeners, flocculants, pharmaceuticals, fragrances, and dyes. Various foreign jurisdictions, including the European Commission, consider it a possible carcinogen. The agencies also designated butane and isobutane for further assessment.

Concerns over the use of formaldehyde in pressed-wood products are getting increased attention. California issued new rules on these products, and the EPA published an Advance Notice of Proposed Rulemaking.

An investigation by CDC is underway to determine if antimony in fire-resistant clothing is posing a health risk. The issue was triggered by complaints in the Boca Raton FL Fire Dept. The European Parliament voted to prohibit around 22 substances used in pesticides due to their potential health hazards. Two separate bills address the issue: one banning the very hazardous substances from pesticides and another considering use reduction of all pesticides. Three transborder geographical regions within the EU—rather than countries—can rule on the use of specific products, while countries can ban a product because of specific environment or agricultural circumstances. [January 2009. Military Implications, Sources[286]]

New Substances Identified as Harmful to Human Health and the Environment

California has identified 30 new chemicals with detrimental effects to human health, ranging from gasoline additives, to industrial solvents, chemicals used to manufacture plastics, adhesives and other materials, and byproducts of water disinfection using chlorine.

The Kenyan Parliament is considering a ban on Furadan, a highly toxic pesticide widely available in Kenya, but already banned in the U.S. and Europe.

A study of a weed-killer by scientists at the Institute of Biology of the University of Caen in France has added evidence to the finding that an "inert" ingredient in a product may have toxic effects outweighing any attributed to the principal ingredient(s) in the material. In their research, polyethoxylated tallowamine (POEA), a surfactant, was shown to be more lethal to certain human cells than the product's active ingredient, glyphosate. [Previous items on similar issues: *Stockholm Convention Updated with Nine New Chemicals* in May 2009, *New Chemicals Considered for Toxic Lists* in January 2009 environmental security reports.] [June 2009. Military Implications, Sources[287]]

Canada Extends Toxic Substances Lists

Health Canada declared four chemicals with varied uses to be toxic to human health (but not toxic to the environment): 2-(2-Methoxyethoxy) ethanol (DEGME); 2-Methoxyethanol acetate (2-MEA); 2-methoxy-1-propanol; and C.I. Pigment Red 3. Actions to manage related hazards have been proposed or are under study. In January the government declared two types of siloxanes, D4 and D5, as toxic to the environment. Health and Environment Canada also determined that pigments yellow 34 and red 103, thiourea, isoprene, and oxirane were toxic to

human health, and that 2,4,6-tri-tert-butylphenol or TTBP is an environmental toxin. [March 2009. Military Implications, Source[288]]

Concerns Increasing for BPA Bans and Phthalates

Canada has announced it would ban the use of bisphenol-A (BPA) in baby bottles, and the U.S. Safeway grocery chain will stop selling plastic baby bottles made with BPA. The U.S. National Toxicology Program and the FDA Science Board have recently indicated concern over the health safety of the chemical. Similarly, phthalates, used in a wide variety of products, are also beginning to be subjected to scrutiny for their effect on the genital development of male fetuses. [See also *Questions on Bisphenol A Risk Raised Again* in April 2008 environmental security report.] [October 2008. Military Implications, Sources[289]]

Greenhouse Gas Emissions

Post-Kyoto Protocol Negotiations

The second round of preliminary negotiations for a UN climate treaty revealed that developed countries are unlikely to cut emissions between 25% and 40% from 1990 levels by 2020, Japan, U.S., and Canada being among the ones that are hindering negotiations, due to tough resistance from industry at home. Hence, a 15% target seems more realistic. However, the Association of Small Island States is pushing for a 45% reduction in greenhouse gas emissions by 2020. The African Ministerial Conference on the Environment adopted the Nairobi Declaration on climate at a week-long special session, to be put forward at the Copenhagen negotiations. Some argue that the "G2" of China and America determines the global post-Kyoto agenda.

Meantime, the U.S. Congress passed the American Clean Energy and Security Act of 2009, which gives stronger power to the U.S. at the Copenhagen negotiations. The bill sets a framework for reducing greenhouse gases in the U.S. by 17% below 2005 levels by 2020, and 83% by 2050. The bill sets a CO_2 cap-and-trade system—scheduled to begin in 2012, requires at least 20% renewable electricity production by 2020, and allocates billions of dollars to new energy-efficient and low-carbon projects.

During the climate change preparation conference in Bonn emissions trading and emissions credits systems were also discussed. Nevertheless, experts and environmental groups are increasingly opposing the carbon credits market, as a source of pollution in developing countries. [June 2009; Military Implications, Sources[292]]

The text for a new treaty on the reduction of greenhouse gas emissions to be negotiated at the December meeting in Copenhagen was posted online. The 53-page negotiating text includes four sections: "A shared vision for long-term cooperative action; Enhanced action on adaptation; Enhanced action on mitigation; Chapter IV: Enhanced action on financing, technology and capacity-building." The next talks on the negotiating text will be held in Bonn, June 1-12. [May 2009; Military Implications, Sources[293]]

The first of three sessions preparing for the Copenhagen conference, held March 29-April 8 in Bonn, Germany, was attended by more than 2,000 delegates from government, business and industry, environmental organizations, and research institutions. While progress was made on many issues, mainly related to technology cooperation between industrialized and developing countries and deforestation, the deadlock concerning rapidly developing countries—such as India and China—in mandatory reductions framework continues. Meantime, an alliance of 43 island states, backed by more than a dozen nations from Africa and Latin America, urged developed countries to cut greenhouse emissions by at least 45% below 1990 levels by 2020, and by at least 95% below 1990 levels by 2050. Countries have the opportunity to provide input to the draft for the negotiating text ahead of the next round of talks to be held in June. [April 2009; Military Implications, Sources[294]]

An International Scientific Congress on Climate Change: Global Risks, Challenges & Decisions was held in preparation for the December conference. The outcomes will be published in a full synthesis report June 2009. However, there are concerns that the richness of new information might increase policy-makers' confusion about setting priorities and targets. Scientists tend to agree that the widely accepted 2°C (3.6°F) warming target might not be enough to prevent some of the worst impacts of climate change.

India announced that it intends to resist accepting legally binding greenhouse gases emissions cuts at the negotiations for the new post-Kyoto treaty. [March 2009; Military Implications, Sources[295]]

The EU proposes that richer countries cut greenhouse gas emissions by 30% by 2020, and that developing countries (except the poorest) cut emissions to 15%-30% below "business as usual" levels. The proposal suggests setting up a carbon market for richer countries by 2015 and that poorer countries be included five years later. The proposal will be submitted for member states' approval at a summit in March. An important shortfall is the lack of budget.

The McKinsey report *Pathways to a low carbon economy* addresses the feasibility and conditions to keep global warming within the 2°C limit. The report finds that it is possible to reduce GHG emissions "to stay on track until 2030" but immediate action and a strong policy framework are needed. Any delay might result in missing the 2°C limit.

At the World Economic Forum, BP Chief Executive Tony Hayward said that the world should establish a price for carbon emissions.

Delegates attending the Ministerial Conference on Transport held January 14-16, 2009, in Tokyo, called on the International Maritime Organization and International Civil Aviation Organization to prepare by the end of the year "a package of appropriate mechanisms for reducing emissions," from the aviation and shipping sectors. [January 2009; Military Implications, Sources[296]]

Over 11,000 participants from 190 nations attended the conference held in Poznan, Poland, December 1-12, 2008 to advance negotiations for a post-2012 climate change regime.. Despite little progress on filling in the gap between rich countries' rhetoric and real commitments for addressing climate change (partly due to the global financial conditions), procedural decisions were made and there were commitments from governments for negotiating an effective new UN climate treaty and response to climate change to be agreed at the Copenhagen meeting in December 2009. A first draft of the text would be presented at a UNFCCC conference to be held

in June 2009, in Bonn. Also, UN Secretary-General Ban Ki-moon said that he is considering convening a summit focused on climate change at the time of the General Assembly in September 2009. While a few industrialized countries openly undermined progress, most developing countries came with clear and constructive proposals. Progress was made in the area of technology transfer with the endorsement of the Poznan Strategic Programme on Technology Transfer that aims to increase investments for mitigation and adaptation technologies in developing countries and in reducing greenhouse gas emissions from deforestation and forest degradation.

Hans Joachim Schellnhuber, head of the Potsdam Institute for Research on Global Warming Effects and adviser to German Chancellor Angela Merkel on climate-change issues, says that in order to avoid a disastrous climate change, global CO_2 emissions would need to be reduced 50% by 2050, meaning an 80%–90% decrease for industrial countries. [December 2008; Military Implications, Sources[297]]

In the preamble to the Poznan meeting to be held December 1-12 as part of negotiations for a post-2012 treaty, the UN released an analysis of greenhouse gas emissions, showing that of 40 industrialized countries that have greenhouse gas reporting obligations under the Kyoto Protocol 16 are on target, and 20 countries—including Canada, Germany, Ireland, Italy, Japan, New Zealand and Spain--are lagging. However, it notes, "the biggest recent increase in emissions of industrialized countries has come from economies in transition, which have seen a rise of 7.4% in greenhouse gas emissions within the 2000 to 2006 time-frame." The report did not include large emerging economies like those of India and China.

Australia said that it will advocate that rich developed countries—such as Singapore and South Korea—be also included in any binding targets.

The "Algiers Declaration" by Africa's 53 countries calls for the development of a common vision and to act as a bloc in the negotiations for the new global warming treaty. [November 2008; Military Implications, Sources[298]]

The WWF report *Climate Change: faster, stronger, sooner* calls on the EU to adopt an emission reduction target of at least 30% below 1990 levels by 2020 (compared to the present 20% target) in the EU territory, rather than by overseas offsetting. It also suggests stronger EU leadership at the international level for a post-2012 climate treaty and increased EU funding for developing countries to address climate change and adaptation.

Japan drafted a new post-Kyoto protocol to be submitted in December at the 14th Conference of the Parties to U.N. Framework Convention on Climate Change (COP14) [October 2008; Military Implications, Sources[299]]

The *Climate Change Review* by Professor Ross Garnaut, commissioned by Australia's government, assesses what should be targets for cutting CO2 emissions by the greatest emitting countries to respond to climate change. The report recommends the following targets: for Australia 80% for 2050 with a 10% interim by 2020; same for Canada; for the U.S. 81%, for Japan 75%, and the EU 69%. If considering emissions per capita, China should cut only 4%. The Australian Federal Treasury will release its emissions trading scheme economic model in October, while emissions trading legislation is expected to be introduced by the end of the year. [September 2008; Military Implications, Sources[300]

The third UN climate talks for a post-2012 treaty took place August 21-27 in Accra, Ghana, attended by about 1,600 delegates from some 160 nations. Progress was made on focus-issues such as strategies for slowing deforestation in developing nations, and considering a sectoral approach for greenhouse gas reduction targets. Rich countries insisted on a differentiation of approach and obligations of developing nations to greenhouse gas emissions based on their economic strength, pointing out that some developing nations such as Singapore, Argentina and some OPEC states have grown richer than some developed nations which have to comply with greenhouse gas emissions cut obligations. Rapidly industrializing countries have refused to accept the overall reduction targets that would be imposed on the rich nations, but progress was made in developing nations accepting targets for specific, highly polluting industries such as cement, steel, and aluminum. The conclusions will be compiled for further discussion at COP 14 in December 2008, in Poznan, Poland.

Some nations outside the Kyoto framework want to set binding targets for emissions and act as a bridge between the developing and developed nations. For example, South Korea wants to announce in 2009 its 2020 greenhouse gases targets.

Japan announced plans to reduce total carbon emissions by up to 80% by 2050. In order to engage consumers in the "CO_2 reduction revolution," carbon footprint labels will be put on most products' packaging. [July-August 2008. Military Implications, Sources[301]]

Regulations Might be Needed for New Greenhouse Gases

New findings show that some compounds developed to replace banned chemicals are powerful greenhouse gases contributing to global warming. The hydrofluorocarbons (HFCs) that replaced the ozone-depleting chlorofluorocarbons (CFCs) can be up to 10,000 times more powerful in climate-warming than CO_2. And, with their use growing at 8.8% per year, they might represent up to a third of all greenhouse gas emissions by 2030–2040. The Obama administration is considering proposing HFCs phase-out by an amendment to the Montreal Protocol or by creating a new international agreement. Similarly, sulfuryl fluoride, a fumigant introduced to replace methyl bromide, is a heat-trapping gas 4,800 times stronger than CO_2. Delegates at the Bonn climate change meeting targeted more than a dozen new synthetic compounds for inclusion in the post-Kyoto treaty as potent greenhouse gases. The list includes nitrogen trifluoride (NF3) — used for LCD televisions, computer circuits, and thin-film solar cells—estimated to be an about 17,000 times more potent greenhouse gas than CO_2, and developed to replace perfluorocarbons (PFCs) covered by the Kyoto Protocol. [April 2009. Military Implications, Sources[302]]

Aviation and Shipping should be Subject to Emissions Cuts

The EU is proposing to include the shipping industry in the Emission Trading Scheme from 2013. However, climate scientists argue that, given the rapid growth of emissions from international aviation and shipping, it is not enough that they are included in the carbon-trading scheme, but they should be subject to emissions cuts regulations. [See also *Aviation to be included in the ETS from 2012* in July-August 2008, *Shipping to Face New Regulations to Reduce Air Pollution* in September 2007]

Meantime, local actions are increasing. In California, a "clean trucks" program put in place by local port authorities will begin operating 1 October, when all pre-1989 diesel rigs will be barred from entering the Los Angeles and Long Beach waterfront marine terminals. The restrictions will

continue incrementally through 1 January 2012, when only trucks meeting federal 2007 emission standards will be allowed in. [September 2008; Military Implications, Sources[303]]

Aviation to be included in the EU Emissions Trading System from 2012

The European Parliament adopted legislation to include aviation in the EU Emissions Trading System starting January 1, 2012. The regulation applies to all flights starting and/or landing in Europe (including intercontinental flights) by EU and non-EU airlines. Exceptions apply to: flights for humanitarian purposes under a UN mandate; emergency flights; police, customs and military flights; research flights; and small airline companies producing low emissions. [See also *Provisional Agreement for Including Aviation in the Emission Trading Scheme from 2012* in June 2008 and other related items in previous environmental security reports.] [July-August 2008; Military Implications, Sources[304]]

Airline Group Supports Including Aviation in Global Emissions Trading Scheme

An aviation group expressed support for a global emissions-trading scheme and hopes that their proposal will be included in the new post-Kyoto pact to fight climate change. The 43-point proposal covers all carbon pollution from the international aviation sector, suggesting a framework for allowances and the creation of a UN body for administering the system, and recommending that nations agree to a global cap on aviation emissions. The six-member group includes four of the world's top airlines (Air France/KLM, British Airways, Cathay Pacific, Virgin Atlantic), airport operator BAA, and the international NGO, The Climate Group. [April 2009. Military Implications, Source[305]]

New Zealand Adopts Carbon Trading Scheme in 2009

The New Zealand Parliament passed the Climate Change (Emissions Trading and Renewable Preference) Bill that will set up the country's first emissions trading scheme to help meet the country's obligations under the Kyoto Protocol. The carbon credits system begins in 2009 and is set by sectors. All industries in a sector will effectively set limits on the amount of emitted greenhouse gas, with those who surpass their ceilings having to buy credits from emitters that produced emissions below their ceiling. The phases of sector inclusion are: forestry from 2008; transport by 2009; stationary energy, such as coal-fired power stations by 2010; and agricultural waste by 2013. Australia's carbon trading scheme is set to begin by 2010. [September 2008. Military Implications, Sources[306]]

China Adopting Pollution Tax Systems

Reportedly China formed a team of experts from several government agencies to study whether to impose an environmental tax on polluters to encourage emissions cuts. Deputy Minister for Environmental Protection Pan Yue was quoted as saying that the team is also assessing issues of compensation for environmental damage and creation of a trading system for polluting gases. There are no details of the proposed tax or when it might be introduced. China already introduced taxes aimed at emission reductions: in 2007 it cut export tax rebates for energy-intensive products, and in September 2008 it raised consumption taxes on large passenger vehicles. [September 2008; Military Implications, Sources[307]]

New Jersey Ports Pushing for Toxic Diesels Ban

The New Jersey Port Authority is considering imposing a ban of some kind on polluting diesel trucks at the ports of Newark and Elizabeth, perhaps similar to the one already set up in Southern California. [See also *Aviation and Shipping should be Subject to Emissions Cuts* in September 2008 environmental security report.] [January 2009. Military Implications, Source[308]]

New Technologies

For information on Nanotechnology see Nanotechnology in the Safety Issues section

Space Technology

Increasing Militarization of Space Might Require Outer Space Treaty Review
Steps for an International Regime for Space Debris and Space Traffic Control System
International Satellite Collision Triggers Regulations Review
Rocket Launches Might Need Regulation to Safeguard Ozone Layer

Increasing Militarization of Space Might Require Outer Space Treaty Review

The European Space Agency Ministerial meeting in The Hague, Netherlands held November 25–26 adopted a new European space policy, which increases ESA's role in addressing climate change and global security, setting new objectives and budgets for the agency. The programs include: Earth Observation activities (including the second segment of the Global Monitoring for Environment and Security Space Component); the Meteosat 3rd generation and a novel Climate Change Initiative; continued improvement of the Galileo navigation satellite system; and start of a Space Situational Awareness programme to help protect European space systems against space debris and the influence of adverse space weather. [See also *Increased Use of Space Technology for Monitoring Environmental Events* in September 2008 and other related items in previous environmental security reports.]

The Space, Security and the Economy report by Economists for Peace and Security warns that the present U.S. space dominance policy threatens an arms race in space with possible devastating consequences for the economy and the growing scientific and commercial uses of space. The report calls for greater transparency in military space spending, and detailed information about government and commercial space activities. Along the same lines, the report From Venus to Mars: the European Union's steps towards the militarisation of space by the Netherlands-based think-tank Transnational Institute argues that European and international trends to increasingly use space for military rather than civilian objectives might trigger a new arms race; and, therefore, the UN Outer Space Treaty might need to be reconsidered and broadened. [November 2008. Military Implications, Sources[310]]

Steps for an International Regime for Space Debris and Space Traffic Control System

There is general agreement that some international regime should be developed to address the increasing problem of space debris, and space safety in general. After the 5th European Conference on Space Debris held in April at ESA's Space Operations Centre in Darmstadt,

Germany, a Congress of technical and legal experts was held in Montreal, focusing specifically on the legal aspects and guidelines for debris mitigation. The possibilities mentioned were a mechanism similar to the Missile Technology Control Regime, or the Limited Test Ban Treaty, along with an eventual international space traffic control system. The recommendations will be further discussed at the next workshop to be held at the University of Cologne in May 2010. Several nations such as Russia, France, Germany and Japan have some form of space surveillance capability, the best being the US Space Surveillance Network (SSN), which is capable of tracking objects larger than 5 cm (approx. 2 inches) orbiting in Low Earth Orbit. The DOD's Commercial and Foreign Entities pilot program, which makes collision avoidance information available to commercial space users, would become an operational program later this year.

In a related event, an asteroid missed the Earth by 48,000 miles—80% closer to the earth than the moon—and no one knew it was coming. If it had hit the earth, possibly 800 square miles would have been wiped out. "NASA's Jet Propulsion Laboratory reported that on March 2, asteroid 2009 DD45 came within about 48,000 miles of Earth. In astronomical terms, that's way too close for comfort. And yet during President Barack Obama's most recent press conference, no reporter asked him about this just-missed catastrophe. The fact is, the world hardly noticed" and "Asteroid 2009 DD45 was estimated to be between 69 and 154 feet in diameter. An asteroid that size exploded over Siberia in 1908 and flattened more than 800 square miles of forest, killing everything in its path. No one had a clue that 2009 DD45 was out there or that it was basically on a years-in-the-making possible collision course with our planet. The need for the governments of the world to come together to formulate a plan?" [May 2009. Military implications, Sources[311]]

International Satellite Collision Triggers Regulations Review

The collision between a decommissioned Russian spacecraft and a commercially owned US satellite on February 10, 2009, triggered review of international regulations for operating near-Earth objects. According to some space scientists, the accident may have caused 700 pieces of space debris in an area where other satellites orbit, thus raising the likelihood of other collisions. Experts note that, considering the over 17,000 (and the number is increasing) man-made objects of size over 10 cm that orbit Earth, an advanced ability to monitor objects in orbit, such as a Space Situational Awareness (SSA) system might be needed. The UN Office for Outer Space Affairs called on all Member States and international organizations to help curb space debris by fully implementing the voluntary Space Debris Mitigation Guidelines of the UN Committee on the Peaceful Uses of Outer Space. The issue was also discussed at the recent 46th session of the Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space and an international response will be presented for consideration in 2010, at the Subcommittee's 47th session. The 46th meeting also adopted the draft Safety Framework for Nuclear Power Source Applications In Outer Space, to be transmitted for consideration and agreement by the IAEA Commission on Safety Standards during its meeting to be held in Vienna, April 22-24, 2009. [See also *China's ASAT Test Created Serious Long-Range Low-Earth Orbital Pollution* in February 2007, *Outer Space Policy* in November 2008 and other related items in previous environmental security reports.] [February 2009. Military implications, Sources[312]]

Rocket Launches Might Need Regulation to Safeguard Ozone Layer

Scientists warn that rapid growth of space activity requiring more rocket launches might lead to dangerously high levels of ozone-destroying emissions and therefore recommend adopting international regulations for rocket launches. One option would be to include the space industry in the Montreal Protocol that bans use of chlorofluorocarbons (CFCs) in aerosol cans, refrigerants and air conditioners. "If left unregulated, rocket launches by the year 2050 could result in more ozone destruction than was ever realized by CFCs," said a team member, Professor Darin Toohey of the Atmospheric and Oceanic Sciences Department at the University of Colorado, Boulder. [See also *Call for Expanding Montreal Protocol on Ozone-Depleting Substances* in September 2007 environmental security report.] [April 2009. Military Implications, Source[313]]

Nuclear Safety

Advancements on Non-proliferation and Nuclear Disarmament

The 3rd conference of the preparatory committee for the May 2010 review of the Nuclear Non-Proliferation Treaty concluded successfully, agreeing on a president and agenda. Meanwhile, the international Conference on Disarmament agreed on a working plan that includes negotiation of a fissile material cutoff treaty; a ban on space-based weapons—proposed by Russia and China; and a comprehensive nuclear disarmament proposed by India and Pakistan.

The International Atomic Energy Agency is considering proposals for establishing an international center for production and distribution of civilian nuclear power plant fuel. The main proposals are from Russia, which offered to establish an international fuel enrichment station in Siberia, a German proposal that calls for an IAEA enrichment site on "internationalized soil;" and from Kazakhstan, that offered hosting a nuclear fuel bank. [May 2009. Military Implications, Sources[314]]

Waste Management

European Union to Consider Regulations for Curbing Biowaste

The European Commission is conducting an assessment of the potential need for and impact of legislation for reducing biowaste and its environmental impacts. The new regulation should reinforce the EU Landfill Directive, including a large spectrum of measures, from prevention, handling, and treatment, to product labeling. However, important aspects will need to be elucidated, from definitions related to biowaste, to countries infrastructure differences. Biowaste in the EU is estimated to rise to 139 million tonnes yearly, representing an important source of greenhouse gas emissions and other pollution when deposited in landfills. The Commission should present the impact assessment of different policy options by the end of 2009, and the legislative proposal is expected to be adopted in 2010. [June 2009. Military Implications, Sources[316]]

Weapons-related

Increased Efforts Needed to Counter the Proliferation of Weapons of Mass Destruction

The second report of the U.N. Security Council 1540 Committee concluded that although nations have made progress since the first report of the committee in April 2006, further measures are needed to completely carry out their obligations under the resolution intended to counter the proliferation of weapons of mass destruction. Information on all 192 U.N. nations was collected, out of which 155 provided reports on their 1540 implementation activities. The committee's recommendations include enhancing its own efforts, as well as improving collaboration with global and regional intergovernmental organizations to assist nations with the implementation process.

"It's Asia that has the most potent latent capabilities to develop nuclear, chemical and biological weapons," said Paul Dibb, professor at the Australian National University's Strategic and Defense Studies Center, at an Asian Pacific security forum. He also noted that groups such as the Association of Southeast Asian Nations and the Asia-Pacific Economic Cooperation forum have failed to establish effective nonproliferation arrangements, while Australia's Prime Minister Kevin Rudd's suggestion for an Asia Pacific Community to deal with security challenges in the region enjoys little enthusiasm. The mission of the new U.N. Regional Center for Peace and Disarmament in Asia and the Pacific, opened in Katmandu, Nepal, is to counter possible nuclear smuggling by terrorist and criminal groups in the region.

Meanwhile, the Global Partnership Against the Spread of Weapons and Materials of Mass Destruction, initially supporting the program to secure and destroy WMD materials in Russia and Ukraine, agreed to expand their efforts to other countries (not yet specified). [See also *New Concerns Rising over Chemical Weapons* in April 2007 and other related items in previous environmental security reports.] [July-August 2008; Military Implications, Sources[318]]

Support for Total Ban on Nuclear Weapons Increases

Marking the 40th anniversary of the nuclear Non-Proliferation Treaty, on July 1, 2008, members of the European Parliament launched a Parliamentary declaration in support of the Nuclear Weapons Convention and a move towards total elimination of nuclear arsenals. Meantime, Australia established the International Commission on Nuclear Non-Proliferation and Disarmament, the Seven Nation Initiative for nuclear disarmament got revived, and both U.S. presidential candidates supported the vision of a nuclear weapons-free world. [See also *Australia to Propose Panel to Advance Work for the NPT Review in 2010* in June 2008, *Non-Proliferation Treaty Deadlock Continues* in May 2008 and other related items in previous environmental security reports.] [July-August 2008; Military Implications, Sources[319]]

Advancements in Setting the Agenda for the 2010 NPT Review

The first meeting of the International Commission on Nuclear Nonproliferation and Disarmament was held in Sydney, October 20-21, 2008. As stated in the press conference, the Commission is at an "idea-formulating stage, … refining and defining the issues" and formulating the work plan. The framework of negotiations is based on the NPT three pillars: disarmament, non-proliferation, and peaceful use. The Commission was created to help set the agenda for the 2010 Nuclear Nonproliferation Treaty review conference. [See also *Australia to Propose Panel to Advance Work for the NPT Review in 2010* in June 2008 and other similar

items in previous environmental security reports.] [October 2008. Military Implications, Sources[320]]

Biological Weapons Convention Meeting, August 2008

The Meeting of Experts from States parties to the Biological Weapons Convention (BWC) held in Geneva, August 18–22, 2008, is part of a four-year program to improve effectiveness of the Convention. The focus of the meeting was increasing biosafety and biosecurity at international, regional, and national levels. The proposals included: improving awareness and education of scientists and policymakers; adopting and/or developing codes of conduct (especially for scientists who deal with biological materials); establishing international standards and external certification and audit mechanisms; increasing regional and international cooperation to improve biosafety and biosecurity methods; and organizing workshops for officials and scientists. [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.] [July-August 2008; Military Implications, Sources[321]]

IMPROVED ENFORCEMENT OF ENVIRONMENTAL REGULATIONS

Likelihood of Climate Lawsuits Increasing

Advances in environmental science and computer modeling are improving estimates of human-influenced climate change and its influence on extreme weather events. Some experts suggest that the likelihood of related litigation might increase, as sectors and companies that are considered serious contributors to climate change or promoters of public misinformation could be held liable for climate-change effects. Beyond Adaptation, a paper by WWF UK, notes that a new UN framework to compensate victims of climate change in developing countries is needed and suggests an international compensation fund to be set up by some future UN treaty. [December 2008. Military Implications, Sources[323]]

UK Could Seize Planes to Enforce European Emissions Trading Scheme

The UK Environment Agency will have increased power to seize assets from airlines that do not respect the new scheme to limit flights' carbon emissions in view of the European Emissions Trading Scheme for aviation. The measure is introduced in an effort to enforce regulations in the special case of airlines, which do not have fixed assets in the UK. [See also *Provisional Agreement for Including Aviation in the Emission Trading Scheme from 2012* in June 2008 and other similar items in previous environmental security reports.] [March 2009. Military Implications, Source[324]]

New UN-linked Body Proposed to Protect Biodiversity and Ecosystem Services

As the IPCC helped to put global climate change on the world agenda, a new organization is proposed to do the same for biodiversity and ecosystem services. Building on the Millennium Ecosystem Assessment and the Consultative Process Towards an International Mechanism of Scientific Expertise on Biodiversity, the proposed Intergovernmental Science-Policy Platform on

Biodiversity and Ecosystem Services (IPBES) would bring together the policymaking and scientific communities from the biodiversity and ecosystem areas to provide timely information to support decision making. The framework for the new UN-linked body was discussed at an ad hoc intergovernmental and multi-stakeholder meeting held November 10-12, 2008 in Putrajaya, Malaysia, attended by over 175 participants from nearly 100 countries and more than 20 organizations. The meeting's results will be presented at the 25th session of the UNEP Governing Council. [November 2008. Military Implications, Sources[325]]

Intergovernmental Forum on Chemical Safety becomes part of the International Conference on Chemicals Management

The Intergovernmental Forum on Chemical Safety will be integrated into the International Conference on Chemicals Management (ICCM) as an advisory body providing an open, transparent and inclusive forum for addressing new and emerging issues related to sound chemicals management. The decision was taken at the sixth session of the IFCS, held in Dakar, Senegal, September 15-19, 2008. The Forum also considered nanotechnology issues, decided to include manufactured nanomaterials on its agenda, and discussed (without reaching consensus) international transport of lead and cadmium via trade. [See also *Call for Global Ban on Lead-based Paints* in October 2007, *Call for Reinforcements to Chemical Safety* in September 2006, and other related items in previous environmental security scanning reports.] [September 2008; Military Implications, Sources[326]]

Progress in the Elimination of Chemical Weapons Stockpiles

Participants to the 13th session of the Conference of the States Parties to the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction held at The Hague, December 2-5, 2008, noted progress as nearly half of the stockpiles of chemical warfare materials declared by possessor States have been verifiably destroyed, it and reiterated the call that the actions be completed by the required April 29, 2012 deadline. Two countries have finished the operations, work continues in India, Russia and U.S., and Japan has begun the cleanup of chemical weapons abandoned in China during World War II, while Libya has yet to begin the process. The U.S. has already acknowledged that it can't meet the deadline and there are also considerable doubts about Russia and Japan meeting it. One of the main issues considered at the meeting was the 2009 budget for the convention's verification and monitoring body, the Organization for the Prohibition of Chemical Weapons. [See also *Problems with Destruction of Chemical Weapons and Potential Proliferation* in October 2007, and other related items in previous environmental security reports.] [December 2008. Military Implications, Sources[327]]

Ozone Continues to Thin over Antarctica, Casting Doubt on Success of the Montreal Protocol

The World Meteorological Organization estimates that the ozone hole over Antarctica this year is 8% larger than its peak in 2007 and it might take another 50 years to completely recover. Nevertheless, without the Montreal Protocol, the impact at the polar regions would have been more significant, shows the "world avoided" computer model, which considers only chlorine changes, all the other variables being constant. [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.] [September 2008; Military Implications, Sources[328]]

New Air Quality Evaluation Tool

According to a news story in Science Daily "The Grupo de Modelos y Software para el medio Ambiente of the Facultad de Informática at the Universidad Politécnica de Madrid has developed a very sophisticated tool (OPANA) that estimates the impact of air quality on the health of citizens using last generation models. … [It produces] extremely precise measurements of the concentration of a certain atmospheric contaminant that a person breathes in a determined time and place, from a particular source (an industry, an incinerator, a motorway, etc.). It is possible to determine the consequent impact under almost any circumstances or distance from the source." The results require the input of accurate data on local topography and land use, meteorology, and, most importantly, the estimated emissions in the area. [March 2009. Military Implications, Sources[329]]

East African Projects to Fight Environmental Crime and Link Journalists

The Environmental Crime Project launched jointly by the Institute for Security Studies and Eastern Africa Police Chiefs Cooperation Organization has the mandate to develop mechanisms to improve environmental law enforcement and policy making in the East African region. The project will operate in Uganda, Kenya, Tanzania, Burundi, Rwanda, Seychelles, Ethiopia and Sudan, increasing protection against all forms of environmental crimes.

The new Network of Climate Journalists in the Greater Horn of Africa (NECJOGHA, www.necjogha.org) represents an interactive resource for environment-related information and communication in the region. The network is the result of collaboration among many international and national environment organizations, universities, and climate centers. [July-August 2008; Military Implications, Sources[330]]

Indonesian Navy to Tighten Security in Sea Border Areas

The Indonesian Navy announced that it will tighten security in its eastern and western sea border areas to support law enforcement efforts at sea for reducing illegal activities such as environmental pollution, smuggling, and even manipulation of shipping documents. Their law enforcement efforts will include prosecution and monitoring cases until sanctions are applied. [September 2008; Military Implications, Sources [331]]

Vietnam Cracking Down on Environmental Violators

Over the past several months, Vietnamese authorities have taken strong measures against some environmental polluters, and the Minister of Natural Resources and Environment has ordered the government to get tough on polluters, levied heavy fines on one factory, and threatened criminal prosecutions. The country is having a hard time, however, in balancing the need for cleaning up its environment with the necessity of attracting and keeping industrial development. [November 2008. Military Implications, Source[332]]

SAFETY ISSUES

Nuclear Safety

IAEA Director Warns on Continuous Nuclear Safety Issues

In his annual report to the UN General Assembly, International Atomic Energy Agency Chief Mohamed ElBaradei said that nearly 250 incidents involving theft or loss of nuclear or radioactive material were reported to the Agency during the year ending in June 2008, meaning that the threat of radioactive material use by terrorist or malicious forces remains high. Also troubling is that much of that material is not subsequently recovered, or sometimes material is found that was never reported missing. He reiterated the need for effective binding international agreements and global nuclear security standards, advanced and independent verification technology, and stronger legal authority and resources for the Agency. Since 1993 when IAEA data exchange began, 1,340 incidents were reported, including 18 with highly enriched uranium or plutonium. [See also *IAEA Director's Recommendations to Improve Nuclear Safety* in September 2007 and other related items in previous environmental security reports.] [October 2008. Military Implication, Sources[335]]

New Recommendations for Reducing Nuclear Risk

"Lifting the Nuclear Shadow: Creating the Conditions for Abolishing Nuclear Weapons" is a plan released by the British Foreign Ministry on steps towards elimination of nuclear weapons worldwide.

"Future of the Nuclear Security Environment in 2015" by the U.S. National Academies and the Russian Academy of Sciences presents avenues for cooperation to improve the international nuclear security environment by 2015. [February 2009. Military Implications, Sources[336]]

Nuclear Security Addressable only Internationally

The head of the National Nuclear Security Administration, Thomas D'Agostino, said that the international community should agree on a common set of security standards to prevent the spread of WMD and terrorists or rogue nations acquiring sensitive materials. "Let me be clear when I say I believe the United States has a special responsibility in advancing nonproliferation and global security. But we should not and cannot do it alone," he said. One important player might be the World Institute for Nuclear Security. The Institute formally opened its doors on September 29, 2008 in Vienna, Austria.

Meantime, a new disarmament study, Abolishing Nuclear Weapons, by the International Institute for Strategic Studies, examines the steps needed for 'getting to zero' and criticizes leaders advocating nuclear disarmament while "none of these states has an employee, let alone an interagency group, tasked full-time with identifying what would be required to verifiably decommission all its nuclear weapons." [See also *Increased Efforts Needed to Counter the Proliferation of Weapons of Mass Destruction* in July-August 2008, and other related items in previous environmental security reports.] [September 2008; Military Implications, Sources[337]]

International Nuclear Safety Regime Review

"A Guide to Global Nuclear Governance: Safety, Security and Nonproliferation" is a review of international agreements and bodies addressing nuclear safety and security issues around the world. The report was prepared by the Canadian Centre for International Governance Innovation and is intended to be followed next year by a report of recommendations to improve international monitoring of nuclear material and combat proliferation. [September 2008; Military Implications, Sources[338]]

Potential Health Threats of Some New Technologies

New Technologies Need New Regulations Systems

The "New Life, Old Bottles: Regulating First-Generation Products of Synthetic Biology" report published by the Woodrow Wilson International Center for Scholars, addresses the relevance of existing regulatory systems in view of developments in synthetic biology specifically and emerging new technologies generally. It argues that the current regulatory framework might not be adequate to address the challenges associated with conditions and properties related to emerging technologies (such as nanotechnology and synthetic biology); and, therefore, new sets of regulations might be needed. While specifically investigating the U.S. system, the principles and analysis are valid globally. [See also *Dangers Increase from "Amateur" Genetic Engineering; the Biological Weapons Convention to be Updated* in December 2008 and other similar issues in previous environmental security reports.] [March 2009. Military Implications, Sources[339]]

The Woodrow Wilson International Center Opens Synthetic Biology Project

Genomic pioneer Craig Venter has said that we will write genetic code to create artificial biology, as we wrote computer code to create software. Synthetic biology holds great promise but also may create unintended consequences and a new weapons source for bioterrorists of the future. The Woodrow Wilson International Center for Scholars launched the Synthetic Biology Project in January within the Center's Foresight and Governance Project to "foster informed public and policy discourse concerning synthetic biology" by providing "independent, rigorous analysis that can inform critical decisions affecting the research, commercialization and use of synthetic biology." Some experts estimate that by 2015 a fifth of the chemical industry could be dependent on synthetic biology. A Wilson Center panel exploring unresolved synthetic biology ethical questions remarked that, although threats related to synthetic biology are not different from those related to most sciences, regulations are lagging, opening the possibility for misuse. Hence, they suggested that the problem to be addressed is to get policy and commercial organizations to adopt ethical criteria, standards, and policies. [January 2009. Military Implications, Sources[340]]

Geo-engineering Promises/Threatens Major Consequences

Discourse over the use of geo-engineering in the strategies for reducing greenhouse gas emissions increases. While some projects appear to offer major environmental benefits at a fraction of the cost of currently proposed remedial measures for climate change, many also raise

the specter of potential catastrophic and perhaps unforeseen consequences. The National Academy of Sciences recently held a workshop to discuss this topic. Some of the papers are available online and the proceedings are expected to be posted soon. [June 2009. Military Implications, Sources[341]]

Nanotechnology

Assessmet of Potential Health and Environmnetal Implications of Nanotechnology

Some Conferences on Nanotechnology with Environmental Security Implications

Assessmet of Potential Health and Environmnetal Implications of Nanotechnology

Corporations under Stockholder Pressure for Nanotech Disclosure
UN Report Assesses Nanotech and Climate Change
Study of Scientists' and Public's Views of Nanotechnology
New Policy Brief: Appropriate Risk Governance Strategies for Nanotechology Applications in Food and Cosmetics
New OECD Report on Nanotech Risks in the Workplace
International Approaches to the Regulatory Governance of Nanotechnology
Wide Use of Nano-Silver Raises Health and Environmental Issues
EU Parliament Recommends Stronger Nanotech Precautions
New EU Committee Report Very Critical of Nanotech Regulation
Report on Ethical Evaluations of Nanotechnology
New Review of Analytical Methods to Assess Nanoparticle Toxicity
ObservatoryNANO Annual Report Published
EU ObservatoryNANO Project in Expanded Operation
EU to Fund Nanoparticle Environmental Risk Study
European Nanotech Safety Proceedings Published
New EU Study on Regulation and Governance of Nanotechnologies
European Report on Workplace Exposure to Nanoparticles
SAFENANO Publishes First Global Review of EHS Risks of Nanotechnology
National Research Council Calls for Better Nanotech Risk Assessment
New report on Oversight of Next Generation Nanotechnology
EPA to Require Company Nanotube Use or Import Notices
Russia Introduces Nanotechnology Certification System
Pressure Increases in Australia for Nanotech Safety Regime
New South Wales Pushes for Nanotech Risk Protection
China Moves Strongly into Nanotech Arena
New Estimation Technique for Nanoparticles in the Environment
Comparison of Micro- and Nano-particles' Toxicity to Cells
Comprehensive Overview of Nanomaterial Properties and Biological Interactions
Environmental Effects from Nanomaterial Production May Outweigh Its Benefits
Evidence of Damage to Beneficial Microbes from Nanoparticles
EU Tightens Safety Precautions on Nano-containing Cosmetics
New Study on the Carcinogenicity of Nanoparticles and Other Dusts
New Study Shows Nanoparticles In Sewage Could Escape Into Bodies Of Water

New Study of Nanomaterials and Plant Toxicity
New Batteries Raise Health/Safety Worries about Lithium Nanoparticles
High Aspect Ratio Nanoparticles May Pose Asbestos-like Risks
Possible Environmental Hazard from Quantum Dots
Diesel Exhausts Emit Nanoparticles Affecting Lung Function
Survey of Nanotube Toxicity to Immune Systems
UK Report on Novel Materials in the Environment: The case of nanotechnology
Proposal for Establishing an Arab Council on Nanotechnology (ACON)
Tunisian Nanotech Association Formed
New Paper Reviews Aspects of Public Perception of Nanotech
New Book Studies Media and Nanotechnology

Corporations under Stockholder Pressure for Nanotech Disclosure

According to a story in Meridian Nanotechnology and Development News, a number of companies are coming under pressure from stockholder resolutions to make public the presence of nanomaterials in their products, and their policies for dealing with these possibly hazardous substances. [January 2009. Military Implications, Sources[343]]

UN Report Assesses Nanotech and Climate Change

The Institute of Advanced Studies of the United Nations University issued a new report, Innovation in Responding to Climate Change: Nanotechnology, Ocean Energy and Forestry, that, "offers three innovative solutions in responding to climate change, namely nanotechnology, ocean energy and forestry", critically assesses, "the opportunities and challenges that each type of innovation presents", and, "addresses the question why these innovations—despite their large potential to reduce emissions, ocean energy alone could cover the world's electricity needs—have not yet reached the stage of mass commercialization." [December 2008. Military Implications, Sources[344]]

Study of Scientists' and Public's Views of Nanotechnology

A new paper reports on "the heuristics that the leading U.S. nanoscientists use when they make policy decisions about regulating nanotechnology" and compares them with the corresponding process in the general public. Included in their work is data on which nanotech application areas the scientists feel are most in need of new regulations. The authors highlight that although there is no conclusive evidence on many environmental and health aspects of nanotechnology, policy and some legal framework should be established. [June 2009. Military Implications, Sources[345]]

New Policy Brief: Appropriate Risk Governance Strategies for Nanotechology Applications in Food and Cosmetics

The International Risk Governance Council has published a recommendations document, Appropriate Risk Governance Strategies for Nanotechology Applications in Food and Cosmetics. This report presents the conclusions arrived at as the result of an April 2008 "multi-stakeholder expert workshop (with representatives from regulators, industry, academia and consumer groups) … to discuss key issues and to develop risk governance policy guidelines for

nanotechnology applications in food and cosmetics." [June 2009. Military Implications, Sources[346]]

New OECD Report on Nanotech Risks in the Workplace

The OECD has published a report, Preliminary Analysis of Exposure Measurement and Exposure Mitigation in Occupational Settings: Manufactured Nanomaterials that, "provides researchers with suggestions on how to respond to the lack of standards on techniques for measuring workplace exposure to nanomaterials." Further, "Researchers can still institute and develop standards on an individual basis, the report says, but recommends that consensus standards, biomarkers, and other tools and resources need to be developed." The report also outlines the first part of an OECD project on this issue. [April 2009. Military Implications, Sources[347]]

International Approaches to the Regulatory Governance of Nanotechnology

The Regulatory Governance Initiative (RGI) at Carleton University, Ottawa ON, has published a new report, International Approaches to the Regulatory Governance of Nanotechnology, that addresses the question: "How have Canada and other jurisdictions reacted to the recent emergence of nanotechnology-based products in the marketplace (and what is the current state of affairs)?" According to the story in Nanowerk News, it contains descriptions of the policy, regulatory, and stewardship approaches undertaken, and discusses the effectiveness of these approaches. [May 2009. Military Implications, Sources[348]]

Wide Use of Nano-Silver Raises Health and Environmental Issues

Friends of the Earth and Health Care Without Harm Europe have published a report describing the public health threat posed by the use of nano-silver particles as an anti-microbial element in consumer products. Use of this material may risk the development of bacterial resistance to it, and, as it is released into the environment, it may interfere with bacterial action in waste treatment processes. [June 2009. Military Implications, Source[349]]

EU Parliament Recommends Stronger Nanotech Precautions

Meridian Nanotechnology & Development News reports a Bureau of National Affairs story that the European Parliament has forwarded to the European Commission a resolution saying that current regulations are not sufficiently precautionary for handling nanomaterials. According to the story, it "has no legislative force, but must be considered by the European Commission when formulating EU policy on nanotechnology. The Commission's current approach to nanomaterials is that no major regulatory initiative is necessary." [April 2009. Military Implications, Sources[350]]

New EU Committee Report Very Critical of Nanotech Regulation

Nanoforum reported that the European Parliament is currently discussing its Committee on the Environment, Public Health and Food Safety's draft report on regulatory aspects of nanomaterials. The report is very critical of the present state of nanotech regulation in the EU and calls for much more stringent measures. [February 2009. Military Implications, Sources[351]]

Report on Ethical Evaluations of Nanotechnology

The Wilson International Center's/Pew Trust's Project on Emerging Nanotechnologies has issued a new report on *Ethical Evaluations of Nanotechnology* that strives to, "…address social and ethical issues … [and] both the substantial potential risks of nanotechnology and its possible significant contributions to our well-being and environmental sustainability," and, "emphasizes ways in which such topics intersect with governmental functions and responsibilities, including science and technology policy, as well as research funding, regulation and work on public engagement", according to a Project announcement. [January 2009. Military Implication, Source[352]]

New Review of Analytical Methods to Assess Nanoparticle Toxicity

According to the abstract, "Nanotoxicology relies on many analytical methods for the characterization of nanomaterials as well as their impacts on in vitro and in vivo function. This review provides a critical overview of these techniques from the perspective of an analytical chemist, and is intended to be used as a reference for scientists interested in conducting nanotoxicological research as well as those interested in nanotoxicological assay development." [March 2009. Military Implications, Source[353]]

ObservatoryNANO Annual Report Published

The EC FP7 ObservatoryNANO project has published its Annual Report, summarizing developments in the field, including their effects, and concerns for human health and the environment. [June 2009. Military Implications, Source[354]]

EU ObservatoryNANO Project in Expanded Operation

The EU FP7 "ObservatoryNANO" project [See April 2008, item *EU's Seventh Research Framework Programme*] has expanded its operation. Its Web site, http://www.observatory-nano.eu - is now on-line, and contains (click on "Catalogue"), most of 56 recently written interim reports on scientific and technological developments in all sectors of nanotechnology, including energy, environment, and health. [November 2008. Military Implications, Source[355]]

EU to Fund Nanoparticle Environmental Risk Study

The EU is launching a new project, ENNSATOX, led by Dr Andrew Nelson, a chemist at the University of Leeds, to investigate the environmental impact of nanoparticles found in everyday products, such as suntan cream, including the relationship between the physical structure of nanoparticles and their toxicity. The project has been awarded €3 million, and will involve scientists from five countries.

This new project is especially significant since research has not yet settled the question of whether metallic compound nanoparticles in preparations, like sunscreens, applied to the skin constitute a health risk. According to a published report, an inquiry by the New South Wales Parliament in Australia has, "concluded that nano versions of existing chemicals should be assessed as new chemicals and recommended that 'ingredient labelling requirements for sunscreens and cosmetics include the identification of nano-scale materials' ". The same report

states, "The [Therapeutic Goods Administration] estimates about 70 per cent of sunscreens with titanium dioxide and 30 per cent with zinc oxide have these materials in a nanoparticle form." The ENNSATOX project will pay particular attention to this family of compounds. [December 2008. Military Implications, Sources[356]]

European Nanotech Safety Proceedings Published

The proceedings of the European Commission Dialogue Workshop on Nanotechnology: Safety for Success, held in Brussels in October, have been published online, covering a number of topics in nanotech regulation and risk assessment. [December 2008. Military Implications, Sources[357]]

New EU Study on Regulation and Governance of Nanotechnologies

"Mapping Study on Regulation and Governance of Nanotechnologies" published by the EU project FramingNano provides a comprehensive overview of nanotechnology regulations and governance at European and global levels, as well as identifying relevant stakeholders for further negotiations of a Governance Plan for responsible development of nanotechnologies. [February 2009. Military Implications, Sources[358]]

European Report on Workplace Exposure to Nanoparticles

The European Agency for Safety and Health at Work (OSHA) has released a 91-page "Literature Review - Workplace exposure to nanoparticles.", which, according to an item in Meridian Nanotechnology and Development News, "reviews the most recent publications on nanoparticles and focuses on the possible adverse effects of workplace exposure while also presenting the regulatory background and activities being taken to manage this emerging risk." [June 2009. Military Implications, Source[359]]

SAFENANO Publishes First Global Review of EHS Risks of Nanotechnology

According to an article in Nanowerk News, Defra, the UK Government Department for Food & Rural Affairs, has published a report, EMERGNANO: A review of completed and near completed environment, health and safety research on nanomaterials and nanotechnology, from the SAFENANO initiative. "[The report] provides a unique identification and analysis of research carried out worldwide on nanotechnology safety, including that relating to hazard, exposure, risk assessment & regulation." The article continues, "EMERGNANO identified more than 670 projects from around the world, and … assessed more than 260 unique, relevant projects …. The final report provides a comprehensive listing of projects, alongside detailed evaluation of their outputs." See also *UK Launches New Nanotechnology Environmental Service* in January 2008 environmental security report.] [April 2009. Military Implications, Sources[360]]

National Research Council Calls for Better Nanotech Risk Assessment

The National Research Council issued a new report, *Review of Federal Strategy for Nanotechnology-Related Environmental, Health, and Safety Research*, that, "finds serious weaknesses in the government's plan for research on the potential health and environmental risks posed by nanomaterials", and emphasizes that, "An effective national plan for identifying and

managing potential risks is essential to the successful development and public acceptance of nanotechnology-enabled products". [December 2008. Military Implications, Sources[361]]

New report on Oversight of Next Generation Nanotechnology

The Wilson Center's Project on Emerging Nanotechnologies has issued a new report that calls for the creation of a new Department of Environmental and Consumer Protection to oversee product regulation, pollution control and monitoring, and technology assessment. [May 2009. Military Implications, Source[362]]

EPA to Require Company Nanotube Use or Import Notices

The U.S. Environmental Protection Agency (EPA) Office of Enforcement and Compliance Assurance will begin enforcing a requirement that companies file premanufacture notices for manufacturing or importing carbon nanotubes, beginning March 1, 2009. [February 2009. Military Implications, Source[363]]

California Requests Nanotube Safety Data

The California Department of Toxic Substances Control (DTSC) has asked more than two dozen manufacturers and importers of carbon nanotubes to provide toxicity, monitoring, and safeguards data on those products. There is also a report that Environment Canada may shortly make a similar request to nanomaterial users. [February 2009. Military Implications, Sources[364]]

Russia Introduces Nanotechnology Certification System

Russia has launched NANOCERTIFICA, the Russian Federation's first certification system for industrial nanotechnology production. According to Nanowerk News, the opening press conference addressed "development of testing and the methodological base of the certification system" and "the financing and qualification level of conformity evaluation centers and the possibility of using nanomaterials in medicine, cosmetology, ecology and water purification". [October 2008. Military Implications, Source[365]]

Pressure Increases in Australia for Nanotech Safety Regime

After a recent panel discussion on nanotechnology and occupational health and safety held at Parliament House in Canberra, Australian unions and industry are calling for urgent regulation to protect workers from nanotechnology risks in the face of a dearth of hard data, making for difficult decisions on the nature and timing of new safety requirements. According to an ABC report, Brian Power of the Australian Nano Business Forum believes 98% of nanotechnology is safe, but agrees workers should be protected from any risks. He also emphasizes Australia will ultimately have to follow international guidelines on a company register and labeling. [March 2009. Military Implications, Source[366]]

New South Wales Pushes for Nanotech Risk Protection

The government of New South Wales (Australia) will push for national mandatory labeling of nanoparticles used in workplaces, and for improved testing facilities to assess the safety of new nanomaterials. Suggestions for including immediate labeling of nanoparticles in food, sunscreens

and cosmetics, and that nanoparticles be treated by regulators as new chemicals were not taken. [May 2009. Military Implication, Source[367]]

China Moves Strongly into Nanotech Arena

China has budgeted $18 billion of its stimulus package for R/D this year, and the expectation is that a large piece of that will go into its sweeping nanotech program. A sign of this is that China now produces more papers on nanotech than any other country. A major concern in the future, of course, will be the safety of nanotech-containing Chinese exports. [April 2009. Military Implications, Source[368]]

New Estimation Technique for Nanoparticles in the Environment

Christine Robichaud, at Duke Univ.'s Pratt School of Engineering, and colleagues at Duke and UCLA, have developed a new way of estimating how much of a possibly hazardous material, e.g., titanium dioxide nanoparticles, is being generated, allowing future studies to assess possible risks. "We combined science and engineering knowledge with business and economic modeling to come up with what we think is the maximum amount of titanium dioxide nanoparticles out there," Robichaud said. "By taking the amount of bulk titanium dioxide produced, which is better understood, and applying the rates of new technologies to convert it to the nanoparticle form found in journal articles and patent applications, we estimated the maximum ceiling amount." [May 2009. Military Implications, Sources[369]]

Comparison of Micro- and Nano-particles' Toxicity to Cells

Researchers in the Department of Plant, Soil and Insect Sciences at the Univ. of Massachusetts, led by Prof. Baoshan Xing, have published a new study showing that the size of oxide nanoparticles, in addition to their composition, is an important factor in their toxicity to bacteria, a characteristic with ecological implications. [April 2009. Military Implications, Sources[370]]

Comprehensive Overview of Nanomaterial Properties and Biological Interactions

Researchers at UCLA and the California NanoSystems Institute (CNSI), together with colleagues in academia and industry, have published a research review article that is described as "a comprehensive overview of current knowledge on the physical and chemical properties of nanomaterials that allow them to undergo interactions with biological molecules and bioprocesses". The paper details several important research advancements and their implications for risk assessment. [June 2009. Military Implications, Source[371]]

Environmental Effects from Nanomaterial Production May Outweigh Its Benefits

An item in physorg.com states that "Environmental gains derived from the use of nanomaterials may be offset in part by the process used to manufacture them, according to research published in a special issue of the Journal of Industrial Ecology." A paper by Hatice Şengül and colleagues at the University of Illinois at Chicago, asserts that "strict material purity requirements, lower tolerances for defects and lower yields of manufacturing processes may lead to greater environmental burdens than those associated with conventional manufacturing." A team led by Vikas Khanna at Ohio State University "found, for example, that the lifecycle environmental

impacts [of carbon nanofiber production] may be as much as 100 times greater per unit of weight than those of traditional materials, potentially offsetting some of the environmental benefits of small size of nanomaterials" like less waste and cleaner processes. [October 2008. Military Implications, Source[372]]

Evidence of Damage to Beneficial Microbes from Nanoparticles

Papers presented at the annual conference of the American Chemical Society by scientists from the Univ. of Toledo, the Univ. of Utah, and Utah State Univ. indicated that titanium dioxide, copper oxide, zinc oxide, and silver nanoparticles, all used in consumer products and likely to turn up subsequently in the environment, may damage environmental microbes that perform vital functions, such as removing pollutants from water and may also pose a hazard to aquatic life. [March 2009. Military Implications, Source[373]]

New Study on the Carcinogenicity of Nanoparticles and Other Dusts

According to Nanowerk.com, the German Federal Institute for Occupational Safety and Health has released a study whose aims were to analyze differences between the carcinogenicity of granular dusts in the rat lung after intratracheal instillation, to find out the optimal dose metric for their carcinogenic potency, and to interpret their potential relevance for human health. Four of the 16 dusts tested could be classified as nanoparticles. The conclusion was that, overall, the state of knowledge meets the EU criteria for a classification of most of the particles into category 2 of carcinogenic substances. [July-August 2008; Military Implications, Source[374]]

EU Tightens Safety Precautions on Nano-containing Cosmetics

The European Parliament has tightened up safety requirements on cosmetics to require additional checks on those containing nanomaterials; the new rules take effect in 2012. [March 2009. Military Implications, Source[375]]

New Study Shows Nanoparticles in Sewage Could Escape Into Bodies of Water

Researchers at ETH Zurich, the University of Applied Sciences Wädenswil, and BMG Engineering AG, led by Prof. Wendelin Stark, have shown that a portion of nanoparticles of cerium dioxide in industrial sewage, previously thought to be removed by biological purification or trapped in sewage sludge, can remain in the effluent and can leave the sewage works practically unchanged. According to the news story, what happens to the particles after a sewage plant has scarcely been researched up to now. [July-August 2008; Military Implications, Source[376]]

New Study of Nanomaterials and Plant Toxicity

According to an article and a technical review in nanowerk, Prof. Pu Kun Che and colleagues at Clemson Univ. have published one of the few papers so far on the effects of nanoparticles on plants, and the possible resulting hazards to both the plants and the associated food chain. They determined that nanoparticles above certain concentrations could clog the vascular systems of plants. [March 2009. Military Implications, Sources[377]]

New Batteries Raise Health/Safety Worries about Lithium Nanoparticles

A recent column by Philip Stiff, a member of the Project on Emerging Nanotechnologies at the Wilson Center, raises questions about the "foreseen and unexplored environmental, health and safety risks associated with the manufacture, use, recycling, and disposal of nanoscale lithium-ion batteries", emphasizing the lack of studies on the end-of-life processes for these units. [October 2008; Military Implications, Source[378]]

High Aspect Ratio Nanoparticles May Pose Asbestos-like Risks

A consortium of UK scientists, led by the Institute of Occupational Medicine, Edinburgh, has published a report discussing whether high aspect ratio (much longer than wide) nanoparticles (HARN), such as nanowires and carbon nanotubes, may pose the same health risks as asbestos fibers. The report concluded that there is enough evidence to suggest that HARN, which have the same physical characteristics as asbestos, are likely to induce similar pathology. The report presents a set of prioritized recommendations for future research.

Similar concerns have caused France's High Council of Public Health (HCSP) to recommend that workers in contact with carbon nanotubes receive the greatest protection under French law. Further, a new paper from Chinese researchers systematically reviews most of the experimental results on the variety of factors affecting carbon nanotubes' cytotoxicity. [January 2009. Military Implications, Sources[379]]

Possible Environmental Hazard from Quantum Dots

According to an item in Nanowerk, "New research is showing that quantum dots (QDs) may be toxic to cells under acidic or alkaline conditions." It appears that the metallic shells of these semiconductor nanocrystals, increasingly used in electronic systems, may decompose under non-neutral pH conditions, (e.g. during weathering) releasing toxic zinc or cadmium. [January 2009. Military Implications, Sources[380]]

Diesel Exhausts Emit Nanoparticles Affecting Lung Function

According to a news release, Prof. Angela Violi, of the Univ. of Michigan College of Engineering, is presenting a simulation paper to the American Chemical Society that predicts that nanoparticles from diesel engine exhausts "can get trapped in the lungs and inhibit the function of a fluid [a surfactant] that facilitates breathing". Also the EPA has awarded a grant to a team of researchers led by Prof. Robert Yokel, of the College of Pharmacy at the Univ. of Kentucky, to define the basic properties of nanoparticles of cerium oxide, a diesel fuel additive used in Europe. According to an announcement, the research will define the basic properties of the particles and examine how they are absorbed by the body. [July-August 2008; Military Implications, Source[381]]

Survey of Nanotube Toxicity to Immune Systems

Exploring the Immunotoxicity of Carbon Nanotubes (http://www.springerlink.com/content/g4u1716412126840/) paper reviews some existing studies assessing carbon nanotubes' toxicity to immune systems and provides the potential mechanistic explanation. [September 2008; Military Implications, Source[382]]

UK Report on Novel Materials in the Environment: The case of nanotechnology

The UK Royal Commission on Environmental Pollution issued this latest report, which "examines issues related to innovation in the materials sector and the challenges and benefits arising from the introduction of novel materials (specifically nanomaterials) … [and] makes recommendations on how to deal with ignorance and uncertainty in this area". This document is accompanied by four supplemental reports and is partly based on input solicited from more than 100 organizations with relevant experience. [November 2008. Military implications, Source[383]]

Proposal for Establishing an Arab Council on Nanotechnology (ACON)

An expert meeting on ethics of nanotechnologies in the Arab region has called for creation of an Arab Council on Nanotechnology (ACON). According to the proposer, Dr. Mukhles Sowwan of Al-Quds University in Jerusalem, "The mission of ACON should be to raise awareness of the benefits and dangers of molecular nanotechnology, and assist in the creation and implementation of comprehensive balanced plans for responsible use of this technology." [May 2009. Military Implications, Sources[384]]

Tunisian Nanotech Association Formed

The creation of the Tunisian Association of Nanotechnology has been announced. The Minister of the Environment and Sustainable Development noted, "...the seminal importance of the use of nanotechnologies on the prevention of pollution, water desalination, and the environment", and cautioned that the use of nanotechnology should go, "hand in hand with risk assessment measures to ensure a sound use of these new technologies." According to allAfrica.com, he also announced that the Tunis Environmental Centre of Environmental Technologies (CITET) would open its laboratories to members of the association. [December 2008. Military Implications, Sources[385]]

New Paper Reviews Aspects of Public Perception of Nanotech

According to an article in Meridian nanotechnology & development news, "This article compiles much of the research conducted over the last several years regarding what factors influence the public's perception of nanotechnology." [March 2009. Military Implications, Sources[386]]

New Book Studies Media and Nanotechnology

Nanotechnology, Risk and Communication, co-authored by Professor Stuart Allan of Bournemouth University, United Kingdom [Palgrave Macmillan 2009], is "one of the first major studies of media coverage, policy debates and public perceptions about nanotechnology." [April 2009. Military Implications, Sources[387]]

Some Conferences on Nanotechnology with Environmental Security Implications

- International Environmental Nanotechnology Conference 2008
- European Nanotech Meetings to Be Held in June and September 2009
- Nanoparticle Warnings at Euroscience Open Forum
- European Nanotechnology Conference in Switzerland in September 2008
- Indian Conference on Nanotechnology and Regulatory Issues
- US/Africa/Caribbean Nanotech Conference to Be Held

International Nanotech Workshop to Precede June Prague Meeting
Research Awards on Nanotech and Energy Presented to Nine Projects

International Environmental Nanotechnology Conference 2008

The 2008 International Environmental Nanotechnology Conference: Applications and Implications will be held 7-9 October in Chicago IL. According to the announcement, "The conference will bring together researchers and practitioners from around the world to discuss the nanotechnology applications for remediation of environmental contaminants; the implications of releasing manufactured nanoparticles into the environment, and pollution control and nano-enabled sensing." [September 2008; Military Implications, Source[389]]

European Nanotech Meetings to Be Held in June and September 2009

EuroNanoForum 2009 will be held from 2 to 5 June 2009, at the Prague Congress Centre, under the auspices of the Czech government and with the support of the Industrial Technologies Programme of the European Commission. According to the announcement, it "…will address the contribution and challenges of nanotechnology research for a sustainable development of European industry and society, such as the need for reduction in carbon emissions and fossil fuels dependence, the substantial increase in energy demand, pollution control, clean water management and sustainable quality of life of the European citizen, as well as material production sustainability and efficiency."
Nanotech Europe 2009 will be held in Berlin 28-30 September 2009. Topics will include health and biology (e.g., improved sensors), and safety (toxicological studies of nanomaterials, risk management, and regulatory issues). [March 2009. Military Implications, Source[390]]

EuroNanoForum 2009 to Be Held in Prague, June 2-5, 2009

The fourth international nanotechnology conference, EuroNanoForum 2009, an official event of the EU, will be held in Prague, June 2-5, 2009, with the topic "Nanotechnology for a Sustainable Economy". Among the individual sessions will be "Environmental applications and implications of nanotechnology" and "Nanotechnology: education, standardization and social perception of benefits and risks". [December 2008. Military Implications, Source[391]]

Nanoparticle Warnings at Euroscience Open Forum

Two speakers at the Euroscience Open Forum in Barcelona discussed the need for more research on the environmental risks posed by nanoparticles. Hermann Stamm, head of nanotechnology and molecular imaging at the Institute for Health and Consumer Protection in the European Commission's Joint Research Council brought up concerns about a connection between nanoparticles from exhaust engines and air pollution, and lung cancers and heart disease. Ken Donaldson, of Queens' Medical Research Institute, Scotland, reported on his work on the asbestos-like properties of nanotubes. [July-August 2008; Military Implications, Source[392]]

European Nanotechnology Conference in Switzerland in September 2008

NanoEurope, a European exhibition for the transfer of nanotechnology knowledge, will be held in St.Gallen, Switzerland 16-17 September 2008. According to the announcement, it "will

present successful commercial nanotechnology applications and introduce new scientific knowledge that can be commercialized", and will also feature a business exposition. [July-August 2008; Military Implications, Source[393]]

Indian Conference on Nanotechnology and Regulatory Issues

An Indian National Conference on Nanotechnology and Regulatory Issues is scheduled January 9-10, 2009 at the Centre for NanoScience and Nanotechnology, Saltlake City, Kolkata. The purpose of the conference is to bring together policymakers, nanoscientists, lawyers and academicians to debate and discuss a range of issues relating to nanotechnology regulation in India. [October 2008; Military Implications, Source[394]]

US/Africa/Caribbean Nanotech Conference to Be Held

The United States-Africa and Caribbean Nanotechnology Initiative (USACANI) Workshop will be held from June 21-26, 2009 in Trinidad, Trinidad and Tobago. According to an announcement in Meridian Nanotechnology & Development News, "The purpose of the conference is to bring together nanoscience and nanotechnology leaders to discuss issues critical to the United States, Africa, and the Caribbean." [February 2009. Military Implications, Source[395]]

International Nanotech Workshop to Precede June Prague Meeting

The 1st ICPC NanoNet Workshop will be held on June 1st, 2009, at the same venue as EuroNanoForum 2009, which begins on June 2nd. [See item European Nanotech Meetings to Be Held in June and September 2009 in March 2009 environmental security report.] The Workshop will present reviews of nanotech activities from speakers representing all regions of the world. [April 2009. Military Implications, Source[396]]

Research Awards on Nanotech and Energy Presented to Nine Projects

E.ON, a leading power and gas company, has presented the E.ON Research Awards to international universities and research institutes. Nine research proposals representing outstanding ideas and innovations in applications of nanotechnology to energy problems were awarded grants. One that attracted particular attention was for a sunlight-driven photocatalysis hydrogen generating process being developed by Prof. Gianluca Li Puma,of the Energy Technologies Research Institute at the Univ. of Nottingham, England. [March 2009. Military Implications, Source[397]]

Underwater Sounds from Human Sources Endangering Marine Life

U.S. Supreme Court Rules in Favor of Navy in Sonar Case

On November 12th the U.S. Supreme Court ruled to lift restrictions on the Navy's use of sonar off the coast of California, arguing that national security interests prevail over possible damages that such sonar might cause to whales and dolphins. [See also *Sonar Restrictions Debate Continues* in January 2008 and other previous environmental security reports on the same issue.] [November 2008. Military Implications, Sources[399]]

POLLUTION

Microplastics Recognized as Environmental Threat to Oceans

A note has been published on the results of a conference held last month to discuss the increasing threat to the maritime environment posed by plastic "microparticles" (< 5 mm). A report quoted a speakers as stating that, "as plastic items break down, any toxic additives they contain—including flame retardants, antimicrobials, and plasticizers—may be released into the ocean environment", "plastics can act like sponges to collect hydrophobic persistent organic pollutants, such as PCBs", and "microplastics can impact marine food chains". [November 2008. Military Implications, Sources[401]]

Health Hazards from "Environment-friendly" Reusable Bags

A new study warns of possible health hazards from reusable plastic bags, revealing high levels of mold, bacteria, and yeast in samples. [Related items: *New Material Makes Biodegradable Plastic Bags* in January 2009, *India to Enact Regulation Curbing Plastic Bags Use* in January 2009, and *Restrictions on Plastic Bags Expanding* in January 2008.] [June 2009. Military Implications, Sources[402]]

Possibly Tainted Imported Drywall Raises Health Fears

A number of complaints from around the US have alerted authorities to possible health and other problems allegedly caused by imported Chinese drywall. It appears that a large but unknown quantity of this product may contain, or have been contaminated with, chemicals that over time emit noxious fumes. [April 2009. Military Implications, Source[403]]

OTHER ENVIRONMENT-RELATED PROTECTION MEASURES

Experts Call For Global Network to Prevent Asteroid Disasters

The report Asteroid Threats: A Call for Global Response by the Association of Space Explorers presented for consideration by the UN calls for an international contingency plan to counter threats from Near Earth Objects (NEO), such as an asteroid impact on the Earth. It points out that although a possible collision is predictable up to 15 years in advance, developing the technology needed to divert an incoming asteroid may require international cooperation. The UN Committee on the Peaceful Uses of Outer Space will debate the report at its 2009 session to be held in June 2009. [November 2008. Military Implications, Sources[404]]

Solar Storm Could Wipe Out Power Grid

A recent article in New Scientist, sparked by a report from the National Academies, calls attention to the grave danger to the electronic environment posed by a very large "coronal mass ejection" – a solar storm, one of which, although admittedly extremely rare (the worst one so far was in 1859), could effectively destroy the electricity grid over a large section of the US. Magnetospheric effects from the coronal plasma ball would induce large DC currents in the high-

voltage grid, melting transformers and leading to a national disaster of unimaginable proportions. [April 2009. Military Implications, Sources[405]]

NEW INITIATIVES AIMING TO INCREASE ECO-EFFICIENCY

EU-US Joint Energy-Efficiency Standards for Office Equipment

The European Commission and the U.S. Environmental Protection Agency agreed to implement the joint Energy Star Programme by introducing higher energy-efficiency standards for office equipment such as computers, copiers and printers. [June 2009. Military Implications, Sources[407]]

Global Investment Road Map for a Transition to a Greener Economy Launched by UNEP

The United Nations Environment Program launched a Green Economic Initiative to encourage an environmentally friendly economy. A comprehensive road map will be delivered to all governments within 18 to 24 months to help make the necessary transitions. Investments considered the most likely for economic returns and job creations are: clean energy and other clean technologies; sustainable agriculture; ecosystem infrastructure; cutting greenhouse gas emissions; and sustainable urban planning. [October 2008. Military Implications, Sources[408]]

Green Economy a Solution for Addressing the Global Economic Crises

Fiscal stimulus packages adopted around the world to help address the economic crises include important measures involving renewable energy and environmental issues. Energy and climate change themes also dominated the World Economic Forum 2009, highlighting that industries related to energy-efficiency are a growing jobs-creating sector. The report Green Investing: Towards a Clean Energy Infrastructure, launched at the Forum, states that clean energy investment should more than triple—to at least $515 billion a year between now and 2030—to prevent emissions reaching unsustainable levels. In the same spirit, UN Secretary-General Ban Ki-moon suggests creating a global Green New Deal. Such initiatives could be important also to reduce potential social unrest in developing countries that could experience a reversal of progress due to the global financial crisis. The crisis could reverse progress by cutting access to capital markets, income from trade and remittances, money from voluntary contributions for UN and other international development efforts, and increasing economic nationalism. As tensions triggered by the economical crises already led to social unrest in several countries around the world, and climate change warnings increase, green economy policies should be implemented without delay as a comprehensive strategy to address both. [See also *Briefings on Environmental Security at NATO Conference* in April 2008 and other related items in previous environmental security reports.] [January 2009. Military Implications, Sources[409]]

Global Fuel Economy Initiative Aims to Increase Cars' Fuel Efficiency 50% by 2050

The Global Fuel Economy Initiative was launched by a coalition of the FIA Foundation, the International Energy Agency, the International Transport Forum and UNEP to call on the global auto industry and governments to reduce by 50% emissions from cars by 2050, mainly by improving fuel efficiency. The report "'50 by 50' Global Fuel Economy Initiative" explains that

improving new car fuel efficiency by 50% could stabilize world emissions through 2050, and outlines a roadmap on how to achieve the goals, with interim targets for 2020 and 2030. An additional outcome is increased energy security, by reducing dependency on oil imports. The number of cars is expected to triple by 2050. The initiative was launched at the 79th international motor show held in Geneva, March 5-15, 2009. [See also *World Leaders Discuss Environmental Security Policies at Davos* in January 2008, *EU Renewable Energy Policy becomes Legally Binding* in December 2008 and other related items in previous environmental security reports.] [March 2009. Military Implications, Sources[410]]

3. Military Implications and Sources

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[1] Environmental Considerations Should be Included in Planning Military Operations

Military Implications:
The report's findings and recommendations are consistent with the AEPI's Army Strategy for the Environment, and therefore could be used to further improve military missions at national and international levels. Additionally, Appendix A "Domestic and International Law in Army Contingency Operations" is an outstanding analysis of environmental regulations—conventional and customary—pertinent to military actions.
Sources:
Green Warriors. Army Environmental Considerations for Contingency Operations from Planning Through Post-Conflict
http://www.rand.org/pubs/monographs/MG632/
Downloadable PDF: http://www.rand.org/pubs/monographs/2008/RAND_MG632.pdf

[2] International Guidance on the Treatment of Individuals in War May Eventually Guild International Standards on the Treatment of the Environment in War

Military Implications:
Long-range military planning might be wise to assume that such guidance will eventually be extended to the environment. Those involved in implementing the Army Strategy for the Environment might meet with relevant personnel at the International Committee of the Red Cross to explore collaboration about future guidance on the environment.
Sources:
Interpretive Guidance on the Notion of Direct Participation in Hostilities under International Humanitarian Law (International Committee of the Red Cross, June 2009)
http://www.icrc.org/Web/eng/siteeng0.nsf/htmlall/direct-participation-ihl-article-020609/$File/direct-participation-guidance-2009-ICRC.pdf
International Law in Brief, June 26. Resolutions, Declarations, and Other Documents
http://www.asil.org/ilib090626.cfm#r1

[3] UN Secretary General Reiterates the Link between Environment and Security

Military Implications:
Using such statements by the UN Secretary-General, the military should continue to increase collaboration with UN organizations such as UNEP, UNHCR, WFP, UNDP, and their partners to prevent environmentally induced conflicts and to manage postwar efforts for sustainability.
Sources:
A Day to Prevent Exploitation of the Environment in War
http://www.ens-newswire.com/ens/nov2008/2008-11-06-02.asp

Action on Nature Part of United Nations Approach to Peace, Says Secretary-General, In Message for World Day to Prevent Exploitation of Environment during Conflict
http://www.un.org/News/Press/docs/2008/sgsm11900.doc.htm
Global pact on explosive remnants of war vital tool to end scourge – Ban
http://www.un.org/apps/news/story.asp?NewsID=28869&Cr=weapon&Cr1=treaty

[4] NATO Report on New Security Threats and Trends

Military Implications:
The report is a comprehensive overview of security threats and challenges in general, providing some concrete recommendations helpful for improving military as well as non-military preparedness for addressing potential environmental security issues. (Note Item 4 above regarding a possible lithium cartel.)
Sources:
NEW HORIZONS. Finding a path away from NATO's de-solidarisation
http://www.natonewhorizons.org/NewHorizons-DigitalEdition.pdf

[5] International Conference on Military's Role in Climate Change

Military Implications:
Outcomes of the conference should be widely disseminated—including to military contractors—and such opportunities should be used to improve global networks for information sharing of environmental best practices to reduce the army environmental footprint, as well as for preparation to mitigate possible climate change-induced conflict situations. DOD personnel attending the conference can be reached for further information.
Sources:
The Importance of Military Organizations in Protecting the Climate: 2008
http://www.igsd.org//conferences/Paris2008.php
[1, 2] Conference Conclusions and Opportunities for Co-operation. Stephen O. Andersen, EPA Climate Liaison to the US Department of Defense
http://www.igsd.org//conferences/Paris2008/3%20Andersen%20conclusions.pdf
Key role for military in climate change, US experts say
http://www.euractiv.com/en/climate-change/key-role-military-climate-change-us-experts/article-177141

[6] UNEP Conference Furthers Environmental Governance

Military Implications:
Working documents and decisions from the UNEP meetings should be reviewed for applications of the Army Strategy for the Environment, rationales for increased military collaboration with UNEP and other organizations to improve environmental governance, and military-to-military opportunities to improve environmental security.
Sources:

25th session of the UNEP Governing Council/Global Ministerial Environment Forum (documents)
http://www.unep.org/GC/GC25/working-docs.asp
25th Session of the UNEP Governing Council/Global Ministerial Environment Forum (analysis)
http://www.iisd.ca/unepgc/25unepgc/
Historic Treaty to Tackle Toxic Heavy Metal Mercury Gets Green Light
http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=562&ArticleID=6090&l=en
Ministers agree to launch negotiations on tackling toxic mercury
http://news.xinhuanet.com/english/2009-02/20/content_10859278.htm
The UNEP will hold a meeting on Biodiversity loss later this year.
http://www.unep.org/GC/GC25/index.asp
Ministers agree to launch negotiations on tackling toxic mercury
http://news.xinhuanet.com/english/2009-02/20/content_10859278.htm

[7] Proposal for a UN Environmental Mediation Program
Military Implications:
Those involved in implementing the Army Strategy for the Environment and other relevant military personnel might contact Ambassador McDonald to explore how the military might collaborate with the development and deployment of the proposed units.
Sources:
GEG Forum: Reflecting on the Past, Moving into the Future
http://environmentalgovernance.org/event/2009/06/geg-forum
For further information, contact: U.S. Ambassador John McDonald, Executive Director of the Institute for Multi-Track Diplomacy, email: <Jmcdonald@imtd.org>
Environmental Security: United Nations Doctrine for Managing Environmental Issues in Military Actions; Appendix C: United Nations Environmental Mediation Program (UNEMP)
http://www.millennium-project.org/millennium/es-un-app3.html

[8] UN Report on the Role of Natural Resources in Conflict and Peacebuilding
Military Implications:
The case studies should be reviewed for insights that could be applied to environmental security planning, training, and policy.
Sources:
From Conflict to Peacebuilding – the Role of Natural Resources and the Environment
http://www.unep.org/publications/search/pub_details_s.asp?ID=3998
Natural Resource Management Critical to Peacebuilding
http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=562&ArticleID=6091&l=en

[9] Environmental Security Issues Discussed at the G8 in Japan, July 2008
Military Implications:

Military personnel with international environmental security related responsibilities should review the G8 conclusions for opportunities for international cooperation, such as liaison with the World Bank's Climate Investment Future (e.g., military role in helping countries adapt to climate change), preparations for the energy forum (e.g., advanced energy-related technologies that could reduce GHG emissions per energy usage), and others.

Sources:

G8 Hokkaido Toyako Summit
http://www.g8summit.go.jp/eng/
Inside Today's Bulletin. Security, Economy On G-8 Agenda
http://www.thebulletin.us/site/index.cfm?newsid=19834312&BRD=2737&PAG=461&dept_id=576361&rfi=8
G8 statement on climate change and environment
http://www.guardian.co.uk/environment/2008/jul/08/climatechange.carbonemissions/print
G8 making climate change sales pitch to China
http://www.canada.com/topics/news/story.html?id=564b804c-3982-45d5-913e-896cec0922fa
Canada touts G8 statement as major breakthrough on climate change
http://canadianpress.google.com/article/ALeqM5gCAmk-uLdpcKdbewMqCoU_CmoPgg
G8 leaders face tough test
http://www.thestar.com/News/Canada/article/455396
Under tight security, G-8 leaders face expectations on climate, oil and Zimbabwe
http://www.pr-inside.com/under-tight-security-g-8-leaders-face-r688258.htm
President Barroso's press conference at the G8 Summit. Hokkaido, Japan, 8 July 2008
http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/08/382&format=HTML&aged=0&language=EN&guiLanguage=en

[10] International Meetings Bring Environment and Security Closer Together

Military Implications:

Relevant military personnel should review the presentations and results from the IUCN Congress and contact participants in the Roundtable on Environment and Security to further explore collaboration, potentials for new regulations, and expanded application of the Army Strategy for the Environment.

Sources:

Roundtable Workshop Environment and Security. Challenges for Change
http://www.envirosecurity.org/challengesforchange/
Barcelona sets environment action agenda
http://www.iucn.org/news_events/events/congress/index.cfm?uNewsID=1946
High seas gems in the spotlight
http://www.iucn.org/news_events/events/congress/media/press_releases/index.cfm?uNewsID=1791
The Review of the 2008 Red List of Threatened Species
http://www.iucn.org/about/work/programmes/species/red_list/review/index.cfm
The conservation Olympics. On being green when the world has the blues
http://www.economist.com/daily/columns/greenview/displaystory.cfm?story_id=12405870
Living on the edge. More species of wildlife are under threat
http://www.economist.com/daily/chartgallery/displaystory.cfm?story_id=12332704&fsrc=rss
Time to invest in nature's capital
http://news.bbc.co.uk/1/hi/sci/tech/7664280.stm

[11] First EU-Central Asia Security Forum Included Environmental Security

Military Implications:

If not already involved in this process, the military should consider collaboration with these EU-Central Asia efforts for applications of the Army Strategy for the Environment, and early warnings of new regulations and other requirements in the region.

Sources:

Paris Hosts First EU-Central Asia Security Forum
http://www.dw-world.de/dw/article/0,2144,3652594,00.html
Human rights take back seat at EU-Central Asia talks
http://euobserver.com/9/26778/?rk=1

[12] ENVSEC to Expand Environmental Co-operation in South Caucasus

Military Implications:

Military stationed in or responsible for relationships with the South Caucasus region should consider the ENSVEC priorities in their planning and actions, adjust the regional engagement plans accordingly, and also offer support to their counterparts to improve environmental aspects of military operations in the framework of the ENSVEC program.

Sources:

Expanded environmental co-operation in South Caucasus on agenda of OSCE-supported meeting in Tbilisi
http://finchannel.com/index.php?option=com_content&task=view&id=31073&Itemid=8

[13] France Supports Brazil's Permanent UN Security Council Seat to Promote Environmental Issues

Military Implications:

If Brazil is added as a permanent member of the UN Security Council, then it is reasonable to assume that the environment, as a security component, will achieve greater world attention. In anticipation of this potential change, military to military relations with Brazil might include discussions of the Army Strategy for the Environment and related environmental security programs.

Sources:

Sarkozy supports Brazil's bid for security council
http://www.iht.com/articles/ap/2008/12/22/news/LT-Brazil-France.php
UPDATE 1-Brazil, EU to prepare joint crisis position for G20
http://www.reuters.com/article/vcCandidateFeed2/idUSN2251166120081222

[14] Conference on Future of the Dutch Military Includes Environmental Security as an Emerging Military Role

Military Implications:

Military personnel with responsibilities in environmental security and military-to-military relations with the Netherlands should review the presentations (especially the Butts presentation) from the conference to see what might be relevant for further study and to keep abreast of the whole Future Policy Survey process.
Source:
Conference "Challenging uncertainties: the future of the Netherlands' armed forces"
http://www.clingendael.nl/cscp/events/20081216/

[15] Somali Piracy is also an Eco-terrorism Threat

Military Implications:
The military involved in the anti-piracy actions should also consider using this opportunity to enforce international compliance with the Basel Convention for toxic waste treatment. Furthermore, it should eventually incorporate observing hazardous waste disposal procedures and trade as part of its security actions in countries where it has peacekeeping forces. This would also be consistent with the U.S. role, as a signatory, and the stewardship goal in the Army Strategy for the Environment.
Sources:
EU firms should stop toxic dumping off Somalia
http://euobserver.com/9/27244/?rk=1
Somalia's piracy problem is everyone's problem
http://www.csmonitor.com/2008/1208/p09s01-coop.html

[16] The Center for a New American Security Launched National Security Program

Military Implications:
In the collaboration with the National Security Program, the military should review the diverse aspects of natural security, consider how it may be called upon to act to protect the natural resources in the future and develop appropriate scenarios.
Sources:
CNAS on Natural Security
http://www.cnas.org/naturalsecurity
Natural Security, A Working Paper, Sharon Burke, CNAS, June 2009
http://www.cnas.org/files/documents/publications/CNAS_Working%20Paper_Natural%20Security_SBurke_June2009_Web_1.pdf

INTERNATIONAL TREATIES RELATED TO ENVIRONMNETAL SECURITY AND MILITARY ACTIONS

[18] The Convention on Cluster Munitions Opens for Signature on December 2nd

Military Implications:

[Same as previous on this issue] 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 support for their prohibition continues to grow.
Source:
Banning Cluster Munitions – making it happen in Oslo
http://www.osloccm.no/

[19] Convention on Cluster Munitions is Effective

Military Implications:
The report provides a comprehensive overview of the countries affected as well as stockpilers of cluster munitions.
Sources:
"Banning Cluster Munitions: Government Policy and Practice" Report Released
http://www.icbl.org/index.php/icbl/Library/News-Articles/Work/Banning-Cluster-Munitions
Launch of New Report - Banning Cluster Munitions
http://www.stopclustermunitions.org/news/?id=1534

[20] The Cluster Munitions Treaty Signed by 94 Nations

Military Implications:
[Same as previous on this issue] Although the U.S. has yet to support the Cluster Munitions Convention, it would be wise for the military to make plans for the elimination of cluster bombs, as international support for their prohibition continues to grow, including among key NATO allies.
Sources:
94 Nations Sign Global Ban on Cluster Munitions
http://www.hrw.org/en/news/2008/12/04/94-nations-sign-global-ban-cluster-munitions
Dozens of nations sign up to UN-backed treaty banning use of cluster bombs
http://www.un.org/apps/news/story.asp?NewsID=29180&Cr=disarmament&Cr1
Six EU states fail to sign cluster bomb ban
http://euobserver.com/9/27231/?rk=1
Collateral damage. America won't sign a treaty banning cluster bombs. But can it use them now?
http://www.economist.com/world/international/displaystory.cfm?story_id=12780720

[21] United States Bans Cluster Munitions Export

Military Implications:
[Similar to previous on this issue] Although the U.S. has yet to support the Cluster Munitions Convention, the military should accelerate plans for the elimination of cluster bombs, as support for their prohibition continues to grow, including at home and among key NATO allies.
Sources:
Cluster Munition Coalition welcomes U.S. Cluster Bomb Export Ban
http://www.stopclustermunitions.org/news/?id=1393

US: Cluster Bomb Exports Banned
http://www.hrw.org/en/news/2009/03/12/us-cluster-bomb-exports-banned
States must take action to ensure elimination of cluster munitions, says Migiro
http://www.un.org/apps/news/story.asp?NewsID=30230&Cr=disarmament&Cr1=
Deputy secretary-general's message to a Special Event on the Convention on Cluster Munitions
http://www.un.org/apps/dsg/dsgstats.asp?nid=160

[22] Global Zero, a New Initiative for Promoting Global Nuclear Disarmament

Military Implication:
If not already part of the process, relevant military personnel should seek to be involved in the Global Zero and other efforts for nuclear disarmament strategies' revision.
Sources:
Global Zero http://www.globalzero.org
A world without nuclear weapons
http://www.guardian.co.uk/commentisfree/2008/dec/08/nuclear-nuclearpower
World leaders try to ban nuclear weapons
http://www.iht.com/articles/ap/2008/12/06/america/NA-US-Eliminating-Nuclear-Weapons.php
EU pushes for cuts in global nuclear arsenal
http://euobserver.com/9/27260/?rk=1

[23] Central Asia Becomes Nuclear Weapon-Free Zone

Military implications
The U.S. and other military forces have to assess the implications of the Central Asian Nuclear Weapon-Free Zone treaty for the bases they have in the region.
Source:
Central Asian Nuclear Weapon-Free Zone Clears Final Hurdle
http://gsn.nti.org/gsn/nw_20081211_1387.php

[24] Undersea Abandoned Ordnance Presents Increasing Environmental and Health Hazards

Military Implications:
The U.S. did not ratify the Law of the Sea, and Protocol V on Explosive Remnants of War (with which it recently deposited the instruments of ratification) is not retroactive; nevertheles, it would be wise to continue to explore methods to clean military remnants. Not only is there a moral responsibily to reduce environmental and health hazards one causes, but the polluter pays principle is increasinngly being applied and hence, international opion could evolve over time toward retroactive liabilities.
Sources:
Addressing Assessment, Characterization, Management and Communication of Risk in Chemical and Conventional Munitions, Worldwide
http://underwatermunitions.com/index.php
Undersea bombs threaten marine life

http://www.cnn.com/2009/TECH/science/02/26/undersea.munitions.cleanup/
Carcinogens found in marine life in island of Vieques in Puerto Rico
http://www.caribbeannetnews.com/news-14429--21-21--.html
U.S. Joins Four Law of War Treaties
http://www.state.gov/r/pa/prs/ps/2009/01/115309.htm

[25] UN to Demand Israel Pay Lebanon Compensations for War Damages

Military Implications:
[Similar to previous on the same issue] The international community is still paying for environmental cleanups for past conflicts. It is likely that there will be growing pressure for increased precision of operations so as to decrease environmental impacts, updating laws that assign liability, and defining redress issues concerning environmental damages in war. [See also related items in Conflict and Post-Conflict Environmental Security Issues section of Chapter 9.1 Emerging Environmental Security Issues on the CD accompanying the 2008 State of the Future report by the WFUNA Millennium Project]
Sources:
Report: UN to demand Israel pay Lebanon $1 billion in reparations
http://www.haaretz.com/hasen/spages/1018564.html
UN chief 'urges Israel to pay Lebanon $1 billion'
http://www.dailystar.com.lb/article.asp?edition_id=1&categ_id=2&article_id=95797

[26] UN to Conduct Post-Conflict Environmental Assessment in Gaza

Military Implications:
Military personnel in the region with environmental security responsibilities should explore liaison with the UNEP inspection team to identify modes of assistance and insights for improved plans and training. Currently, post-conflict cleanups and mitigation are covered by some of the international community on an ad hoc basis. However, pressure is mounting for adopting regulations to include a comprehensive liability and mitigation regime based on the “polluter pays” principle, mainly concerning environmental damages in war, as well as for increased precision in attacks, to decrease environmental impact.
Source:
Assessment and Rehabilitation of Damaged Infrastructure Key Focus of UN Environment Chief's Mission to Gaza Strip
http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=579&ArticleID=6132&l=en&t=long

[27] Iraq Complains of After-conflict Environmental Hazards

Military Implications:
Although the U.S. is not Party to Protocol V on Explosive Remnants of War, considering precedent liability and redress cases, some of the military contractors might be held responsible for various environmental damages caused during the Iraq war. Environmental restoration should

be one of the top considerations in all military and their civilian contractors' withdrawal plans. Item 6, above, is also relevant.
Source:
Iraq scarred by war waste
http://www.theglobeandmail.com/servlet/story/RTGAM.20081024.wiraqenvir1024/BNStory/International/home

[28] Updated Studies on Potential Health Implications of Depleted Uranium

Military Implications:
Since the DU controversy continues, with pressure for creation of international regulations to ban DU munitions, the military should continue to seek alternative high-density projectile materials and glean force health protection recommendations from such studies.
Sources:
Gulf War and Health:Updated Literature Review of Depleted Uranium
http://www.nap.edu/catalog.php?record_id=12183
Epidemiologic Studies of Veterans Exposed to Depleted Uranium: Feasibility and Design Issues
http://www.nap.edu/catalog.php?record_id=12200

[29] Health Threats from Open Waste Pits in Conflict Zones Trigger Regulation

Military Implications:
This case could trigger international attention and potential liability issues and even prompt some international regulations. Military and their civilian contractors should review their practices to ensure that waste disposal is being carried out in ways that are safe for personnel and the environment.
Source:
Vets protest open-pit fires in war zones
http://thehill.com/business--lobby/vets-protest-open-pit-fires-in-war-zones-2009-06-11.html

[30] U.S. Policy Shift May Improve International Environmental Security

Military Implications:
As the military was called upon to play a key role in racial integration, it may be called upon to play a key role in the accelerated adoption of green technology in the U.S. and around the world. The Army Strategy for the Environment should be brought to the attention of President Obama, as military environmental security capabilities might receive more attention from the new U.S. Administration. International military-to-military environmental programs could receive higher profiles. Since climate change is a new top priority, the military should identify all its resources and programs for reducing GHGs and responding to effects of climate change, update information continuously, forecast how it may be called upon for both mitigation and adaptation, and perform a gap analysis in anticipation of future requests.
Sources:
SUBJECT: The Energy Independence and Security Act of 2007
http://www.whitehouse.gov/the_press_office/Presidential_Memorandum_fuel_economy/

SUBJECT: State of California Request for Waiver Under 42 U.S.C. 7543(b), the Clean Air Act
http://www.whitehouse.gov/the_press_office/Presidential_Memorandum_EPA_Waiver/
As Europe Fiddles, U.S. May Take Lead on Climate Change
http://www.alternet.org/environment/119300/as_europe_fiddles%2C_u.s._may_take_lead_on_climate_change_/
California's green light
http://www.economist.com/research/articlesBySubject/displayStory.cfm?story_id=13031009&subjectID=348924&fsrc=nwl
Clinton Climate Change Envoy Vows "Dramatic Diplomacy"
http://planetark.org/wen/51349
'Climate hope' in economic plans
http://news.bbc.co.uk/2/hi/science/nature/7851227.stm
Stepping on the gas
http://www.economist.com/daily/news/displaystory.cfm?story_id=13009620&fsrc=nwl
Barack Obama promises to lead world on climate change
http://www.telegraph.co.uk/news/worldnews/northamerica/usa/barackobama/4349132/Barack-Obama-promises-to-lead-world-on-climate-change.html
Obama's Inaugural Address Shows Concern for the Planet
http://www.ens-newswire.com/ens/jan2009/2009-01-20-01.asp
Obama: Oil dependence, climate change endanger security
http://www.reuters.com/article/reutersComService_2_MOLT/idUSTRE50P4AN20090126
A Strong Signal on Global Warming
http://roomfordebate.blogs.nytimes.com/2009/01/26/a-strong-signal-on-global-warming/?8dpc
President Obama to lawmakers: 'Can't afford delays' on economic rescue plan
http://www.nydailynews.com/news/politics/2009/01/26/2009-01-26_president_obama_to_lawmakers_cant_afford.html
U.S. Should Adopt California Car Rules: Schwarzenegger
http://planetark.org/wen/51371
As Europe Fiddles, U.S. May Take Lead on Climate Change
http://www.alternet.org/environment/119300/as_europe_fiddles%2C_u.s._may_take_lead_on_climate_change_/
'Climate hope' in economic plans
http://news.bbc.co.uk/2/hi/science/nature/7851227.stm
World Economic Forum 2009, Davos
www.reuters.com/davos

[31] U.K.'s Military Technology Plan Includes Alternative Energy

Military Implications:
Military efforts on alternative energy R&D might consult The Defence Technology Plan for potential collaboration with the UK on such R&D and relevance of the Army Strategy for the Environment to issues and opportunities raised.
Sources:
MOD unveils future UK defence tech research plan

http://www.mod.uk/DefenceInternet/DefenceNews/EquipmentAndLogistics/ModUnveilsFutureUkDefenceTechResearchPlan.htm
Defence Technology Plan
http://www.science.mod.uk/Strategy/dtplan/default.aspx

[32] NASA-Like Agency to Achieve a 10-Year Environmental Goal Proposed

Military Implications:
As there were relations between NASA's Apollo program and DOD, there would be relations between any R&D climate change agency and DOD. Hence, the military should monitor the development of the American Climate Alliance and contact the organization as appropriate at the email address below.
Source:
Meetings and email correspondence with Millennium Project Director, Jerome Glenn (jgenn@ig.org) and Foundation for the Future Executive Director, Robert Citron (bobcitron@mac.com)

[33] EU Renewable Energy Policy becomes Legally Binding

Military Implications:
Military stationed in EU member states should review their actions to support the EU 20/20/20 energy policy and seek opportunities to apply the Army Strategy for the Environment.
Sources:
Climate change: Commission welcomes final adoption of Europe's climate and energy package
http://europa.eu/rapid/pressReleasesAction.do?reference=IP/08/1998&format=HTML&aged=0&language=EN&guiLanguage=en
Greens hail EU deal on renewable energy
http://euobserver.com/9/27269/?rk=1

[34] European Climate and Energy Package Formally Adopted

Military Implications:
[Same as previous on this issue] Military stationed in EU member states should review their actions to support the EU 20/20/20 energy policy and seek opportunities to apply the Army Strategy for the Environment.
Sources:
Commission welcomes adoption of climate and energy package
http://europa.eu/rapid/pressReleasesAction.do?reference=IP/09/628&format=HTML&aged=0&language=EN&guiLanguage=en

[35] European Energy Security Strategies

Military Implications:
Military stationed in EU member states should review their actions to coordinate with the EU energy policy and seek opportunities to apply the Army Strategy for the Environment.

Sources:
Worst-hit EU states get least in post-gas crisis plan
http://euobserver.com/9/27493/?rk=1
Merkel puts pressure on EU for Russian pipeline
http://euobserver.com/9/27497/?rk=1
As Europe Fiddles, U.S. May Take Lead on Climate Change
http://www.alternet.org/environment/119300/as_europe_fiddles%2C_u.s._may_take_lead_on_climate_change_/?page=2

[36] Norway Proposal to Ban Gasoline-only New Cars by 2015

Military Implications:
Although applying only to specific countries or regions, such regulations create a precedent and set standards that may eventually expand and may also apply to vehicles from outside but operating in the respective areas. The military should review its current and future procurements in light of the new regulations.
Source:
Ban Gasoline Cars from 2015: Norway Finance Minister
http://planetark.org/wen/52660

[37] Canada, Mexico, and the USA Met to Strengthen Regional Environmental Regulations

Military Implications:
Military personnel with environmental responsibilities that relate to the border areas should keep track of the CEC's work as it affects collaboration among government agencies, which might affect some military operations and collaboration among military counterparts.
Sources:
Commission for Environmental Cooperation (CEC) Ministerial Statement
http://www.cec.org/news/details/index.cfm?varlan=english&ID=2828
Input from Millennium Project staff attending the CEC meeting (for further information contact <millennium-project@igc.org>)
USA, Canada to Modernize Great Lakes Water Quality Pact
http://www.ens-newswire.com/ens/jun2009/2009-06-15-01.asp

[38] Uganda to Create an Environmental Police Unit

Military Implications:
AFRICOM should consider contacting their counterparts in Uganda to explore potential for military-to-military aid and training to support this initiative.
Sources:
Environmental crime on the rise as Nema forms police unit
http://www.monitor.co.ug/artman/publish/news/Environmental_crime_on_the_rise_as_Nema_forms_police_unit_73245.shtml

[39] East African Environmental Projects to Fight Crime and Link Journalists

Military Implications:

AFRICOM and other relevant military components should seek cooperation with the ECP and to both help and use the NECJOGHA, offering support for increasing environmental protection in that highly vulnerable area in order to prevent and/or resolve conflicts related to environmental factors.

Sources:

Stakeholders Meeting and Launch of ISS-EAPCCO Environmental Crime Project
http://www.issafrica.org/index.php?link_id=6299&link_type=12&tmpl_id=3
Launch of the Environmental Crime Project in Eastern Africa
http://www.necjogha.org/node/86
NECJOGHA
http://www.necjogha.org

[40] Japan Sets up e-Waste Collection Locations to Recycle Rare Metals

Military Implications:

Military personnel working on electronic waste and rare metals supplies should review these programs to see what approaches might be transferrable to military installations.

Source:

City takes lead in recycling rare metals
http://www.asahi.com/english/Herald-asahi/TKY200812200045.html

[41] South Korea Adopts a Green Growth Policy and Influences Next G-20 Meeting

Military Implications:

Military-to-military programs in Korea should be reviewed for new opportunities to support the Green Growth initiative.

Sources:

Global Korea
http://joongangdaily.joins.com/article/view.asp?aid=2901440
Lee ambitious about Korea's role in G20 meeting
http://www.korea.net/news/issues/issueDetailView.asp?board_no=20234
President Lee drives eco-friendly growth with "Green New Deal" project
http://dynamic-korea.com/news/view_news.php?main=KTD&sub=&uid=200900273650&keyword=

[42] Maldives to Become World's First Carbon Neutral Country in 10 Years

Military Implications:

It would be interesting to follow Maldives' strategy and results for eventual implementation in other small developing countries that are struggling with energy security and pollution as well as for lessons learned that might be applied to military installations.

Source:

Maldives joins UN emissions scheme in drive to be first carbon neutral country

http://www.un.org/apps/news/story.asp?NewsID=30697&Cr=climate&Cr1=change

TECHNOLOGICAL BREAKTHROUGHS WITH ENVIRONMENTAL SECURITY IMPLICATIONS

[44] Proceedings of the Conference on Wearable Electronics

Military Implications:
The military should consider consulting the conference outcomes to obtain information on possible wearable environmental sensing systems.
Source:
International Symposium on Wearable Computing
http://www.iswc.net/

[45] Robot "Fish" Evaluate Underwater Pollution

Military Implications:
The military should follow the development and testing of this device as an aid to pollution evaluation of bodies of water in both peacetime and conflict environments.
Sources:
Robotic fish: the latest weapon in the fight against water pollution
http://www.bmt.org/News/?/3/0/510
G8 Robotic Fish (video)
http://www.youtube.com/watch?v=gSibkb6aKHM

[46] Autonomous Robots May Need Environmental Concerns

Military Implications:
Along these lines, the military should also consider including in autonomous robots' design and programming concerns related to the environment.
Source:
A Soldier, Taking Orders From Its Ethical Judgment Center
http://www.nytimes.com/2008/11/25/science/25robots.html?_r=1

[47] Wearable Computing Show Scheduled in Milan 20 May 2009

Military Implications:
Appropriate military personnel in the area should consider attending this show to further explore the possible use of wearable computing systems in training, operations, and environmental surveillance.
Sources:
wearIT@work Road Show - 20 May 2009, Milan
http://www.wearitatwork.com/Road-Show-Milan-20-May-2009.321.0.html
wearIT@work project
http://www.wearitatwork.com/

[48] Environmental Early Warning Systems with Web Crawlers

Military Implications:
If not already, the military should include this resource into its scanning process for identifying likely and/or evolving environmental problems with potential security implications.
Sources:
Doing it online: Internet can detect eco-crises
http://www.stockholmresilience.org/research/researchnews/doingitonlineinternetcandetectecocrises.5.589e653711f5b17101b8000415.html
Can information and communication technology help us save the planet? (Blog)
http://resilienceinnovation.blogspot.com/
Can web crawlers revolutionize ecological monitoring? (abstract)
http://www.esajournals.org/doi/abs/10.1890/070204
Crawling the Web to Foretell Ecosystem Collapse
http://blog.wired.com/wiredscience/2009/03/ecodatamining.html

New Detection and Cleanup Techniques

[50] New Substrate Preparations Make for Inexpensive "Labs on a Chip"

Military Implications:
The military should follow up on these techniques as they may become applicable to inexpensive devices that could be widely distributed for environmental surveillance for harmful organisms and chemicals.
Sources:
Paper lab-on-a-chip makes disease tests affordable
http://technology.newscientist.com/channel/tech/dn14790-paper-labonachip-makes-disease-tests-affordable.html
FLASH: A rapid method for prototyping paper-based microfluidic devices
http://www.rsc.org/publishing/journals/LC/article.asp?doi=b811135a
Soft lithography: masters on demand
http://www.rsc.org/publishing/journals/LC/article.asp?doi=b804050h

[51] Miniature Radiation Sensors Could Implement Detection Network

Military Implications:
The military should investigate this development to determine its applicability for environmental surveillance.
Sources:
My Blackberry As A Bomb Sniffer? (NEWSWEEK, Oct 6, 2008)
http://www.newsweek.com/id/161056
Cell phone sensors detect radiation to thwart nuclear terrorism
http://www.purdue.edu/UNS/x/2008a/080122FischbachNuclear.html

[52] New Air Quality Evaluation Tool

Military Implications:
The military should investigate the use of this tool for modeling and managing chemical and biological warfare incidents and in studies of the environmental impact of new projects.
Sources:
New Tool For Study Of Air Quality Developed
http://www.sciencedaily.com/releases/2009/03/090311085406.htm
The evaluation of the air quality impact of an incinerator by using MM5-CMAQ-EMIMO modeling system: North of Spain case study (abstract)
http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6V7X-4SBYYGS-1&_user=10&_rdoc=1&_fmt=&_orig=search&_sort=d&view=c&_acct=C000050221&_version=1&_urlVersion=0&_userid=10&md5=7cd8a3dfb80125e265f078e654526891

[53] Single-walled Carbon Nanotubes Give Support to Antimicrobial Enzyme

Military Implications:
The military should investigate the use of this technique in preventing the spread of harmful organisms in a contaminated environment. This technology might be useful against bio-weapons, and for disease control in medical and food services.
Sources:
Strong Antimicrobial Coatings: Single-Walled Carbon Nanotubes Armored with Biopolymers
http://pubs.acs.org/cgi-bin/sample.cgi/nalefd/asap/html/nl080522t.html
Super strong antimicrobial coatings for medicine, defense
http://www.physorg.com/news134652009.html
Engineering team recognized for breakthrough antimicrobial research
http://www.eng.auburn.edu/admin/marketing/newsroom/2008/june/antimicrobial.html

[54] Nanotube-based Coating Repels Water to Achieve Self-cleaning Surface

Military Implications:
The military should follow this development to evaluate its ability to improve drivers' visibility and to reduce maintenance, and hence the training and operations environmental footprint.
Source:
Carbon Nanotubes with Nanoscopic Paraffin Coating Form Self-Cleaning Surfaces
http://www.azonano.com/news.asp?newsID=6912

[55] Chemical Probe Offers Fast Detection of Ricin

Military Implications:
The military should follow this development for its applicability in a system for detecting the presence of ricin poisoning in an operational or terrorist attack environment.
Source:
Ricin's Deadly Action Revealed by Glowing Probes
http://ucsdnews.ucsd.edu/newsrel/general/08-08RicinGlowingProbe.asp

[56] Single-electron Transistors (SETs) and NEMS Make for New High-performance Sensor
Military Implications:
The military should keep in touch with this program as its development transitions to practical application, and then assess the applications of such sensors in battlefield and environmental monitoring equipment.
Source:
World's Smallest, High-Performance and Low-Power Sensor in Silicon
http://www.azonano.com/news.asp?newsID=6740

[57] New Studies of Bacterial Oil Degradation in Contaminated Soil
Military Implications:
The military should investigate these findings and any subsequent similar work for its applicability to cleanup of damaged environments.
Sources:
Degradation of diesel oil in a polluted soil using Bacillus subtilis
http://www.academicjournals.org/AJB/PDF/pdf2008/17Jun/Nwaogu%20et%20al.pdf
Isolation and characterization of diesel oil degrading indigenous microorganisms in Kwazulu-Natal, South Africa
http://www.academicjournals.org/AJB/PDF/pdf2008/17Jun/Singh%20and%20Lin.pdf

[58] Fluorescent Sensor Bacteria Offer Fast Pollutant Detection
Military Implications:
The military should follow this development as a possible tool for battlefield and environmental contaminant detection systems.
Source:
Detecting Pollution with Living Biosensors
http://www.technologyreview.com/Energy/21383/page1/

[59] New Bacterium Can Provide Arsenic Cleanup and Possibly Detection
Military Implications:
The military should investigate this development for its applicability to bioweapon (those containing arsenic) destruction and to environmental cleanup and surveillance.
Sources:
Bacteria Found That Cleans Up Arsenic Contamination
http://www.ens-newswire.com/ens/sep2008/2008-09-08-01.asp
Researchers find cold-loving, arsenic-eating bacteria in Yellowknife gold mine
http://canadianpress.google.com/article/ALeqM5hWVrCjSf09VceYbYMpwdLAetyBgg

[60] Soil Bacterium May Convert Toxic Metals to Harmless Form
Military implications:

Although more R&D will be required to bring this technique to a point of practical application, the military should become familiar with this line of research for its possible use in environmental cleanups.
Sources:
Antibody-recognition force microscopy shows that outer membrane cytochromes OmcA and MtrC are expressed on the exterior surface of Shewanella oneidensis MR-1
http://aem.asm.org/cgi/content/abstract/AEM.02108-08v1
Common Soil Bacteria Could Clean Up Nuclear Contamination
http://www.ens-newswire.com/ens/mar2009/2009-03-17-092.asp

[61] Fast Multi-hazard Water Analyzer

Military Implications:
The military should investigate this new system for its applicability to environmental assessment.
Sources:
Early Warning, Inc.
http://www.earlywarninginc.com/
Biohazard Water Analyzer Employs a Revolutionary Nanotechnology-Based Biosensor
http://www.azonano.com/news.asp?newsID=10982

[62] Improved Technique for Removing Heavy Metals from Water

Military Implications:
The military should follow up on this development for its potential usefulness in purification systems for water supplies in field environments and for contaminated site cleanup.
Source:
Applying nanotechnology to water treatment
http://www.nanowerk.com/spotlight/spotid=6810.php

[63] Reusable Hydrogels Detect and Remove Heavy Metals from Contaminated Water

Military Implications:
The military should follow this technology, as it develops, for eventual application to systems for environmental testing. Further work will be needed to also apply it to bulk decontamination.
Source:
Berkeley chemists pioneer low-cost water testing devices
http://www.physorg.com/news149261463.html

[64] Improved Techniques for Water Treatment

Military Implications:
The military should follow the developments originating at this Center as they progress toward suitability for field deployment in discovering and restoring damaged water supplies in the environment.
Source:
Clean Water for a Crowded, Contaminated World

http://www.nsf.gov/discoveries/disc_summ.jsp?cntn_id=112996&govDel=USNSF_1

[65] New Membrane for Energy-efficient Water Filtration

Military Implications:
The military should explore the possibility of using this material in water supply systems for polluted environments.
Source:
IBM Makes Water Clean With Smarter, More Energy-Efficient Purification
http://www-03.ibm.com/press/us/en/pressrelease/26921.wss

[66] Water Filter Effective Against Parasites

Military Implications:
The military should investigate the use of this technology in situations that require a simple, low-cost source of clean water.
Source:
Simple Filter Delivers Clean, Safe Drinking Water, Potentially To Millions
http://www.sciencedaily.com/releases/2009/03/090309211938.htm

[67] Inverse Fluidization of Aerogels Removes Oil from Water

Military Implications:
The military should investigate this process for its possible application to practical systems for decontaminating water in a polluted environment.
Source:
Removal of Oil from Water by Inverse Fluidization of Aerogels
http://pubs.acs.org/doi/abs/10.1021/ie800022e

[68] Simple New Technique Supplies Chlorine for Water Purification

Military Implications:
The military should investigate this technology for its possible applicability to producing safe water under difficult environmental conditions and compare its cost and effectiveness with similar systems on the market.
Sources:
International Water Management Systems
http://www.iwmsystems.com/
Iowan makes tainted water fit to drink
http://www.desmoinesregister.com/article/20090222/NEWS02/902220344/1001/NEWS

[69] Carbon Nanotube Adsorbents Remove Water Impurities

Military Implications:
The military should follow these developments as they proceed, to evaluate their applicability to water quality management in naturally and man-contaminated environments.
Sources:
IIT uses nanotech for cheap textile wastewater cleanup
http://www.cleantech.com/news/4271/iit-uses-nanotech-cheap-textile-was
Catalyx develops two-way osmosis to purify wastewater
http://www.cleantech.com/news/4095/catalyx-develops-two-way-osmosis-wa
Researchers claim chemistry breakthrough for environmental cleanup
http://www.cleantech.com/news/3247/green-chemistry-catalyst-promises-safe-clean-alternative

[70] New Techniques for Multi-nanowire Detection Arrays

Military Implications:
The military should follow these lines of research, as they possibly lead to improved battlefield and environmental assessment devices and systems.
Sources:
Nanosensors Made Easy. A trick to assemble nanowires on silicon could lead to cheap, tiny sensing devices
http://www.technologyreview.com/computing/21974/?a=f
Practical Nanowire Devices. A way to align nanowires could lead to better sensors and flexible displays
http://www.technologyreview.com/computing/18802/?a=f
Easy-to-Make Nanosensors. Tiny electronics-based detectors could provide simple tests for cancer or bioterror agents
http://www.technologyreview.com/biomedicine/18127/

[71] New Deep Water Marine Sensors Being Developed

Military Implications:
The military should follow this work as it proceeds to determine its usefulness in assessing the condition of water in battlefield monitoring and environmental management.
Source:
World's first deep-sea 'lab-on-a-chip' sensors proved to work
http://www.soton.ac.uk/mediacentre/news/2008/dec/08_233.shtml

[72] Energy-saving Communications for Underwater Environmental Sensing Networks

Military Implications:
The military should follow this development for eventual consideration in future systems for monitoring of the maritime environment. Such a system can also help enforcing international marine regulations.

Source:
Toward cheap underwater sensor nets
http://www.physorg.com/news162640918.html

[73] New Treatment Improves Congo Red Decontamination

Military Implications:
The military should consider this technique for use in handling instances of industrial contamination of the environment with this toxic chemical.
Source:
Improved biodegradation of Congored by using Bacillus sp
http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6V24-4TCXGB9-2&_user=10&_coverDate=09%2F07%2F2008&_rdoc=1&_fmt=&_orig=search&_sort=d&view=c&_acct=C000050221&_version=1&_urlVersion=0&_userid=10&md5=7b8acf1bfa93ce92353434722cbd4609

[74] Variable Heating Provides New Flexibility for Gas Sensors

Military Implications:
The military should explore this new methodology for its usefulness in systems for detecting and identifying environmental contaminants and battlefield chemical signals of enemy and friendly action.
Source:
Sniffing Out a Better Chemical Sensor
http://www.nist.gov/public_affairs/techbeat/tb2008_1028.htm#nose

[75] Isotope Ratio Evaluates Decontamination Success

Military Implications:
The military should investigate this development for its possible application in monitoring the operation of remediation site water purification systems.
Sources:
A Guide for Assessing Biodegradation and Source Identification of Organic Ground Water Contaminants using Compound Specific Isotope Analysis (CSIA)
http://www.epa.gov/ada/pubs/reports/600r08148/600r08148.pdf
EPA Ground Water and Ecosystems Restoration Research
www.epa.gov/ada
New technique put to use to test clean up of contaminated groundwater
http://www.physorg.com/news152539505.html

[76] New Material Stores Methane in Dry Form

Military implications:
The military should follow this development to assess its assistance in systems for transporting cleaner-burning natural gas for power generation purposes and reducing the military greenhouse gas emissions footprint.

Source:
Chemists at the University of Liverpool have developed a way of converting methane gas into a powder form in order to make it more transportable.
http://www.physorg.com/news146398407.html

[77] Nano-engineered Gold Surface Mercury Vapor Sensor

Military Implications:
The military should investigate this technique for possible use in systems for detecting mercury pollution in the environment.
Source:
Measuring mercury with nanotechnology
http://www.rmit.edu.au/browse;ID=xwzx3dxlgxzi

[78] Manure Aids in Removing Hydrogen Sulfide from Biogas

Military Implications:
The military should investigate the use of this technology in community aid situations in countries where small biogas-producing operations could yield environmental benefits.
Source:
Cornell technology makes biogas greener
http://www.enn.com/top_stories/article/39043

[79] New Nanotube-based Design Yields More Sensitive Pathogen Detector

Military Implications:
The military should follow this work to ascertain its applicability in systems for detecting biological organisms and toxins in the environment.
Source:
Peptide nanotubes for highly sensitive pathogen sensors chips
http://www.nanowerk.com/spotlight/spotid=8464.php

[80] Chemical Weapons-Resistant Chameleon Fabric to be Developed

Military Implications:
In addition to its practical applicability, such a discovery would help reduce the general human and specifically military environmental footprint by reducing the number of different kinds of materiel required for operations. The military should follow and encourage the research for its potential military applicability, also keeping in mind the possible future need for environmental risk assessment of the new materials.
Sources:
US company envisions chameleon camouflage
http://www.smalltimes.com/news/display_news_story.cfm?NewsID=176913
Sandia research points way toward chameleon-like camouflage
http://www.sandia.gov/news/resources/releases/2009/nano_camo.html

[81] Faster and Cheaper Virus Detector Uses Indium Nanowires, Synthetic Antibodies

Military Implications:
The military should investigate this development for its potential application in fast detection and reaction to viral contamination.
Source:
Label-Free, Electrical Detection of the SARS Virus N-Protein with Nanowire Biosensors Utilizing Antibody Mimics as Capture Probes
http://pubs.acs.org/doi/abs/10.1021/nn900086c
A quicker, cheaper SARS virus detector benefits from advances in nanodesign
http://www.nanowerk.com/news/newsid=10908.php

Promising Environmental-friendly Technologies

[83] New Process Improves Water Desalination Efficiency

Military Implications:
The military should follow this development as it is scaled up toward commercialization for eventual use in addressing water scarcity.
Sources:
A Low-Energy Water Purifier. A Yale spinoff hopes to solve the big problem with desalination
http://www.technologyreview.com/business/21934/?nlid=1636&a=f
Global Challenges in Energy and Water Supply: The Promise of Engineered Osmosis
http://pubs.acs.org/doi/full/10.1021/es800812m?prevSearch=McGinnis+osmosis&searchHistoryKey=

[84] Biodegradation of Carbon Nanotubes Could Mitigate Potential Toxic Effects

Military Implications:
The military should take note of this technology in preparation for possible future findings of biological hazards from carbon nanotubes in the environment.
Source:
Biodegradation of carbon nanotubes could mitigate potential toxic effects
http://www.nanowerk.com/spotlight/spotid=8093.php

[85] New Material Makes Biodegradable Plastic Bags

Military Implications:
Considering the increased restrictions adopted by many countries, as well as the recycling issues, the military should follow this development for its applicability. [See Item 7.6 India to Enact Regulation Curbing Plastic Bags Use in this report.] However, the presence of nano materials in this product implies that a suitable risk assessment should be considered before it is used.

Source:
Vietnamese scientists come up with natural plastic
http://www.thanhniennews.com/print.php?catid=4&newsid=45235

[86] Proposed Uniform Device-Charging Scheme Could Yield Environmental Benefits
Military Implications:
The military should investigate this development to determine if it can be usefully applied to its electronic materiel; and hence, contribute to a lower environmental footprint.
Sources:
Pulling the Plug on Phantom Power
http://www.greenercomputing.com/podcast/2008/11/21/pull-plug-phantom-power
Green Plug:
http://www.greenplug.us/index.php

[87] New Scheme for Wireless Sensor Networks Improves Many Metrics
Military Implications:
The military should investigate this technique for use in wireless networks of operational and environmental sensors.
Sources:
Towards a Self-organizing Stochastic-Communications Paradigm for Wireless Ad-hoc Networks
Los Alamos National Laboratory, Los Alamos, NM 87545, USA (sami@lanl.gov)
Networks of the Future: Extending Our Senses into the Physical World
http://www.lanl.gov/news/index.php/fuseaction/home.story/story_id/14183

[88] New Protection for Plastic Electronics
Military Implications:
The military should follow this development for its applicability to the protection of electronic devices used in operational and environmental sensing systems.
Source:
Self-healing protection for plastic electronics
http://www.nanowerk.com/spotlight/spotid=8555.php

[89] New Technique May Solve Wind Farm Interference with Radars
Military Implications:
The military should follow this development in the hope that it would eliminate the need for restrictions on the placement of environment-friendly wind farms near air surveillance radars.
Source:
Cambridge Consultants Ltd. http://www.cambridgeconsultants.com/news_pr202.html
Is it plane? How to make radar work in wind farms
http://www.economist.com/science/displaystory.cfm?story_id=12551574

[90] Environmentally Polluting Ash Turned into Concrete-like Structural Material
Military Implications:

The military should investigate the possible use of this environmentally friendly product in military construction.
Source:
Strong, lightweight green material could replace concrete, but contains no cement
http://www.physorg.com/news146851488.html

[91] Another "Green" Concrete Announced

Military Implications:
The military should investigate the possible use of this environmentally friendly product in military construction. However, the presence of nano materials in this product implies that a suitable risk assessment should be considered before it is used.
Sources:
Ekocrete Launches 'Green' Concrete That Uses 90% Recycled and By-Product Materials
http://www.nanowerk.com/news/newsid=8868.php
Information: info@ekocrete.com (Email address for obtaining more information.)

[92] Integrated Monitoring/Control System Aids Buildings' Environmental Performance

Military Implications:
The military should investigate this integrated system for its applicability to environmental control of buildings on military installations.
Source:
Agilewaves Marries Monitoring and Control in New Smart System
http://www.greenerbuildings.com/news/2008/07/28/agilewaves-marries-monitoring-and-control-new-smart-system

[93] Fiber Check Dams with Chemicals Control Polluting Construction Runoff

Military Implications:
The military should investigate this technology for reducing the environmental damage from construction projects and training.
Sources:
Improving construction site runoff quality with fiber check dams and polyacrylamide
http://www.jswconline.org/content/64/2/144.abstract
Study finds better way to protect streams from construction runoff
http://www.physorg.com/print159190208.html

Technologies for New Generation of Cars

[95] Largest Chinese Car Maker Produces All-electric Model

Military Implications:
The military should assess the technologies employed in this latest non-polluting vehicle for ideas on future developments.

Source:
China's Chery Auto unveils electric car: company
http://www.physorg.com/news154363401.html

[96] Compressed Air Car May Offer Environmental Advantages

Military Implications:
The military should explore this technology to see what vehicle substitutions are practical and consider ordering some for test purposes.
Source:
Pure Driving: The Revolutionary Compressed Air Vehicle
http://zeropollutionmotors.us

[97] New Catalysts Improve Hydrogen Generation Processes for Energy Storage

Military Implications:
The military should follow these developments to assess their usefulness in power supplies for operational fuels and environmental sensing systems.
Sources:
'Major discovery' from MIT primed to unleash solar revolution
http://web.mit.edu/newsoffice/2008/oxygen-0731.html
Scientists learn from nature to split water
http://www.physorg.com/news138179858.html
Solar water splitting for renewable hydrogen production
http://www.sync.monash.edu.au/absorption.html
A better way to make hydrogen from biofuels
http://www.physorg.com/news138450335.html

[98] New Materials Provide Hope for Improved Ultra-capacitor

Military Implications:
The military should follow this development as it progresses toward production status, and evaluate components based on it for applicability to energy storage for environmentally friendly and improved performance systems and vehicles.
Source:
Better Batteries Charge Up
http://www.technologyreview.com/Energy/21171

99 New Materials Provide Improved Ultracapacitor Storage

Military Implications:
The military should follow the development of these materials for their possible use in energy storage systems to reduce their environmental footprints and improve performance.
Sources:
Growth of Manganese Oxide Nanoflowers on Vertically-Aligned Carbon Nanotube Arrays for High-Rate Electrochemical Capacitive Energy Storage
http://pubs.acs.org/cgi-bin/abstract.cgi/nalefd/2008/8/i09/abs/nl800925j.html

Breakthrough In Energy Storage: New Carbon Material Shows Promise Of Storing Large Quantities Of Renewable Electrical Energy
http://www.sciencedaily.com/releases/2008/09/080916143910.htm
Nanoflowers Improve Ultracapacitors. A novel design could boost energy storage
http://www.technologyreview.com/Energy/21375
Important Twist in Supercapacitor Research
http://www.physorg.com/news141048611.html

[100] New Palladium-Platinum Catalyst Structure Increases Fuel Cell Efficiency

Military Implications:
The military should follow this development as it is applied to environmentally friendly fuel cells.
Source:
Going platinum: New catalyst could boost cleaner fuel use
http://www.physorg.com/news161529265.html

[101] Ion Jelly Electrolyte Offers Environmental Advantages

Military Implications:
The military should follow this development for its application to power supplies for operational and environmental equipment.
Source:
Ion jelly could satisfy appetite for greener batteries
http://technology.newscientist.com/article/dn14975-ion-jelly-could-satisfy-appetite-for-greener-batteries.html

[102] Carbon Nanotubes Could Replace Expensive Platinum Catalysts in Fuel Cells

Military Implications:
The military should follow these developments as they progress toward the goal of becoming economically feasible, environment-sparing fuel cell catalysts.
Source:
Cheaper Fuel Cells. Carbon nanotubes could replace expensive platinum catalysts and help finally make fuel cells economical
http://www.technologyreview.com/energy/22074/

[103] New Materials Better for Separating Hydrogen from Other Gases

Military Implications:
The military should follow this development as it may be applied to more efficient production systems for environment-sparing hydrogen power.
Sources:

Mesoporous germanium-rich chalcogenido frameworks with highly polarizable surfaces and relevance to gas separation
http://www.nature.com/nmat/journal/vaop/ncurrent/full/nmat2381.html (Requires subscription or individual article purchase.)
Chemists offer new hydrogen purification method
http://www.physorg.com/news153928167.html

[104] Electrostatic Capacitors Offer Energy Storage Improvement

Military Implications:
The military should follow this development as it proceeds toward suitability for practical use in environmentally friendly vehicles and systems.
Source:
For New Energy Options to Work, Better Storage Methods Needed
http://www.earthtimes.org/articles/show/for-new-energy-options-to-work-better-storage-methods-needed,750464.shtml

[105] New Lithium-Ion Material Improves Recharging Time

Military Implications:
The military should keep in touch with this development, to be able to exploit it in energy storage systems if it proves practicable.
Sources:
Battery materials for ultrafast charging and discharging
http://www.nature.com/nature/journal/v458/n7235/full/nature07853.html
Batteries now included
http://www.economist.com/science/displaystory.cfm?story_id=13277371

[106] Lithium-sulphur Battery Problem Solved by Nanotechnology

Military Implications:
The military should follow this development for applicability to power supplies for environmental equipment. However, alternatives to lithium should also be sought to prevent future dependency. [See item *Future Lithium Dependency Raises New Energy Security Concerns* in March 2009 environmental security report.]
Source:
Lithium battery technology breakthrough could triple their power
http://www.nanowerk.com/news/newsid=10689.php

[107] New Fuel Cell Membrane May Solve Dry Surroundings Problem

Military Implications:

The military should follow this development as it is scaled up and cost-reduced, for possible application in power supplies for use in hot, dry environments.
Source:
New type of membrane developed at Sandia may help make hydrogen hybrid cars a reality
http://www.sandia.gov/news/resources/releases/2009/PEM.html

[108] Environmental Advantages in New Methanol Production Process

Military Implications:
The military should keep in touch with this development as it proceeds toward commercial availability.
Source:
Methanol challenges hydrogen to be fuel of the future
http://www.newscientist.com/article/dn17240-methanol-challenges-hydrogen-to-be-fuel-of-the-future.html

Increasing Energy Efficiency Technologies

[110] Study of Cost and Availability of Possible New Solar Cell Materials

Military Implications:
The military should consult the evaluation paper for ideas on further advancing and accelerating the potential implementation of the most efficient technologies for military purposes.
Sources:
Cheaper materials could be key to low-cost solar cells
http://berkeley.edu/news/media/releases/2009/02/17_solar.shtml
Cheaper materials could be key to low-cost solar cells
http://www.nanotech-now.com/news.cgi?story_id=32198

[111] Nanoparticles Increase Solar Cell Light-gathering Efficiency by 30%

Military Implications:
The military should follow up on this environmentally significant work as it progresses toward full implementation in solar cell design.
Source:
Enhancing solar cells with nanoparticles
http://www.physorg.com/news149266955.html

[112] Diatoms Help Build Better Dye-sensitized Solar Cells

Military Implications:

The military should follow this research as it progresses into commercial availability for use in operational and environmental systems.
Source:
Ancient diatoms lead to new technology for solar energy
http://www.eurekalert.org/pub_releases/2009-04/osu-adl040809.php

[113] Genetically Engineered Viruses Produce Advanced Battery Electrodes

Military Implications:
The military should track this line of development as it proceeds toward practical applicability for use in power supplies for environmental sensing and repair systems and for operational devices.
Source:
Virus battery could 'power cars'
http://news.bbc.co.uk/2/hi/technology/7977585.stm

[114] First Flexible Supercapacitor Built

Military Implications:
The military should follow this line of research as requirements increase for smaller and lighter electronic devices to be used in operational and environmental systems.
Source:
Printed supercapacitor could feed power-hungry gadgets
http://www.newscientist.com/article/dn16939-printed-supercapacitor-could-feed-powerhungry-gadgets.html?DCMP=OTC-rss&nsref=online-news

[115] Mobile Unit Turns Waste into Energy

Military Implications:
The military should investigate this development for usefulness in reducing its environmental foot print by producing energy from waste that might otherwise be destined for uncontrolled burning or a landfill.
Source:
IST Energy (corporate site)
http://www.istenergy.com
New England Firm Says Its New Waste-to-Energy System is a GEM
http://www.greenerbuildings.com/news/2009/01/01/gem

[116] Waste Gasification Still a Controversial Technique

Military Implications:
The military should maintain its awareness of this technology for sparing the environment, and follow the course and evaluations (positive and negative) of the various techniques and projects,

to determine possible applicability to military requirements.
Source:
Could your trashcan solve the energy crisis?
http://www.newscientist.com/article/mg20227051.500-could-your-trashcan-solve-the-energy-crisis.html?page=1

[117] Titanium Nanotube Catalyst A Step Forward in CO2 to Methane Conversion

Military Implications:
The military should follow this line of research as it progresses toward the goal of becoming a practical fuel source.
Source:
High-Rate Solar Photocatalytic Conversion of CO2 and Water Vapor to Hydrocarbon Fuels
http://pubs.acs.org/doi/abs/10.1021/nl803258p (Abstract; full text by subscription)
Sun-powered device converts CO2 into fuel
http://www.newscientist.com/article/dn16621-sunpowered-device-converts-co2-into-fuel.html

[118] Light Emitting Diodes Offer Big Environmental Advantages

Military Implications:
Military personnel responsible for product planning and design should ensure that these advantages of LEDs are considered in lighting device selection for materiel procurement.
Sources:
Transcending the replacement paradigm of solid-state lighting:
http://www.opticsinfobase.org/oe/issue.cfm?volume=16&issue=26
The Green (and blue, red, and white) lights of the future
http://www.physorg.com/news148708739.html
Efficient organic LEDs a step toward better lights
http://www.physorg.com/news149258474.html

[119] Small Omnidirectional Wind Turbines Could Provide Remote Power

Military Implications:
The military should follow this development as improvements evolve, to assess the unit's applicability to the powering of military and environmental surveillance systems.
Sources:
quietrevolution Company
http://www.quietrevolution.co.uk
Tiny Turbines May Have a Bright Future
http://www.spiegel.de/international/business/0,1518,575877,00.html

[120] New Technique Provides Cheaper LEDs

Military Implications:

Although commercial availability of this particular technique is expected to be up to five years off, the military should follow its development and be ready to exploit the less expensive products as the technology matures.
Source:
Cheap, super-efficient LED lights on the horizon
http://www.newscientist.com/article/dn16496-cheap-superefficient-led-lights-on-the-horizon.html?DCMP=OTC-rss&nsref=online-news

[121] Photoelectric Energy Efficiency Increase by Photosynthesis-type Semiconductor Structure

Military Implications:
Although the developers say, "these are early days," the military should follow development of this advance in photoelectric energy production.
Source:
Ultimate In 'Green' Energy: Plants Inspire New Generation Of Solar Cells
http://www.enn.com/top_stories/article/39402

[122] Increased Use of Space Technology for Monitoring Environmental Events

Military Implications:
Further developing an integrating environmental monitoring capability to provide informed data to the public, and policy- and decision-makers, would considerably improve the assessment of potential environmental impacts of different actions, facilitate enforcement of international treaties worldwide, and could help mitigate environmental and social consequences induced by conflicts or natural disasters. The military should consider full cooperation in all the phases—from development to implementation and use of international space-based observation systems.
Sources:
Kopernikus - Europe's eye in the sky
http://www.norwaypost.no/cgi-bin/norwaypost/imaker?id=194211
Forum GMES 2008
http://www.forumgmes2008.eu
Ministers meet to take forward the European Space Policy
http://www.esa.int/esaCP/SEMW506EJLF_index_0.html
China launches natural disaster monitoring satellites
http://news.xinhuanet.com/english/2008-09/06/content_9806611.htm
Report Explores Use Of Earth Data To Support National Priorities
http://www.spacemart.com/reports/Report_Explores_Use_Of_Earth_Data_To_Support_National_Priorities_999.html

[123] Greenhouse Gas Observing Satellite Could Help Enforcing Environmental Regulations

Military Implications:

[Same as previous on similar issues] Further developing an integrating environmental monitoring capability to provide informed data to the public, and policy- and decision-makers, would considerably improve the assessment of potential environmental impacts of different actions, facilitate enforcement of international treaties worldwide, and mitigate environmental and social consequences.
Source:
Greenhouse gases Observing SATellite "IBUKI" (GOSAT)
http://www.jaxa.jp/projects/sat/gosat/index_e.html

Technologies that Could Trigger New Forms of Arms Race

[125] International Standards Needed to Reduce Hi-tech SIMAD Threats

Military Implications:
As these technologies mature and advanced laboratories (private and state) spread around the world, the military should increase efforts for negotiating with its counterparts and participating in international forums to develop guidelines, legal frameworks, and standards to establish control and safety measures related to access to such technologies and equipment.
Sources:
Aircraft could be brought down by DIY 'E-bombs'
http://www.newscientist.com/article/mg20227026.200-aircraft-could-be-brought-down-by-diy-ebombs.html
In the final analysis, electronic warfare will decide the outcome of future military conflicts
http://en.rian.ru/analysis/20090414/121112527.html
Pentagon Preps Soldier Telepathy Push
http://www.wired.com/dangerroom/2009/05/pentagon-preps-soldier-telepathy-push/

B. Preventing or Responding to Environmentally Caused Conflicts

SECURITY IMPLICATIONS OF ENVIRONMNETAL ASPECTS

[128] International Conference on Military's Role in Climate Change

Military Implications:
Outcomes of the conference should be widely disseminated—including to military contractors—and such opportunities should be used to improve global networks for information sharing of

environmental best practices to reduce the army environmental footprint, as well as for preparation to mitigate possible climate change-induced conflict situations. DOD personnel attending the conference can be reached for further information.
Sources:
The Importance of Military Organizations in Protecting the Climate: 2008
http://www.igsd.org//conferences/Paris2008.php
[1, 2] Conference Conclusions and Opportunities for Co-operation. Stephen O. Andersen, EPA Climate Liaison to the US Department of Defense
http://www.igsd.org//conferences/Paris2008/3%20Andersen%20conclusions.pdf
Key role for military in climate change, US experts say
http://www.euractiv.com/en/climate-change/key-role-military-climate-change-us-experts/article-177141

[129] Climate Change Triggers Redrawing Swiss-Italian Borders

Military Implications:
Early analysis of vulnerability to eventual national border changes and preliminary negotiations should be considered as part of conflict prevention strategies in order to avoid potentially escalating situations. Relevant military personnel and those stationed in regions with potential disputes should contact their counterparts to offer assistance with the negotiations, if needed.
Sources:
Melting snow prompts border change between Switzerland and Italy
http://www.independent.co.uk/news/world/europe/melting-snow-prompts-border-change-between-switzerland-and-italy-1653181.html
Climate changes Europe's borders – and the world's
http://www.newscientist.com/article/dn16854-climate-changes-europes-borders--and-the-worlds.html
Additional sources in the Appendix
Melting glaciers force Italy, Swiss to redraw border
http://www.franconarducci.com/Archivio/tabid/67/articleType/ArticleView/articleId/312/Default.aspx
Climate, the glaciers are changing the borders with Switzerland
http://translate.google.com/translate?hl=en&u=http%3A%2F%2Fwww.franconarducci.com%2FArchivio%2Ftabid%2F67%2FarticleType%2FArticleView%2FarticleId%2F307%2FDefault.aspx (English translation)

[130] Climate Change Impacts Assessment on U.S. National Security

Military Implications:
The Assessment of Select Climate Change Impacts on U.S. National Security is an excellent resource for those involved in early warning of environmentally related conflicts.
Sources:
Assessment of Select Climate Change Impacts on U.S. National Security. Center for International Earth Science Information Network (CIESIN) Columbia University, July 1, 2008
http://www.ciesin.columbia.edu/documents/Climate_Security_CIESIN_July_2008_v1_0.ed.pdf
Insecure environment
http://www.canada.com/ottawacitizen/news/editorials/story.html?id=8959925b-ba08-4ee2-972e-93b5ddd4a789

[131] Global Climate Risk Index 2008

Military Implications:

The Global Climate Risk Index might represent a good resource for assessing future possible conflict hot-spots due to climate change.

Source:

Global Climate Risk Index 2008
http://www.germanwatch.org/klima/cri2008.pdf

[132] UN General Assembly Stressed Environment-related Issues (September 2008)

Military Implications:

These speeches reinforce the need to continue to develop the military's policies, plans and systems to anticipate and respond to new forms of security threats, environmental refugees from sea level rising, to increasing natural disasters. Overseas military commanders should be aware of the key themes of speeches given by their respective host heads of state at this session of the UN.

Sources:

General Debate of the 63rd Session (23 September - 1 October 2008)
http://www.un.org/ga/63/generaldebate/
Small Islands to World: S.O.S.
http://www.avaaz.org/en/sos_small_islands/

[133] Future Lithium Dependency Raises New Energy Security Concerns

Military Implications:

Since the countries holding the bulk of the world's lithium may not necessarily prove to be allies, alternative sources and technologies should be sought. The military should focus and intensify efforts to support technologies that use abundant or renewable energy, avoiding resource monopolies or depletion with inherent political and security implications.

Sources:

Bolivia pins hopes on lithium, electric vehicles
http://www.physorg.com/news155115838.html
Mineral wealth, political weapon. Morales wields control of nation's lithium, uranium as cudgel
http://www.washingtontimes.com/news/2009/feb/10/mineral-wealth-political-weapon/
In Bolivia, Untapped Bounty Meets Nationalism
http://www.nytimes.com/2009/02/03/world/americas/03lithium.html?_r=1
Bolivians set to vote on new constitution
http://www.csmonitor.com/2009/0123/p06s01-woam.html
Lithium Supply May Not Be Sufficient for Battery Production
http://flashlightnews.org/story582.shtml
Got lithium? Lots
http://www.autobloggreen.com/2009/01/28/got-lithium-lots/
Lux Alternative Power and Energy Storage Intelligence
http://www.luxresearchinc.com/info/power

Peak Lithium: Will Supply Fears Drive Alternative Batteries?
http://blogs.wsj.com/environmentalcapital/2009/02/03/peak-lithium-will-supply-fears-drive-alternative-batteries/
NEW HORIZONS. Finding a path away from NATO's de-solidarisation
http://www.natonewhorizons.org/NewHorizons-DigitalEdition.pdf

[134] *Global Trends 2025: A Transformed World*

Military Implications:
The report provides a comprehensive outlook on possible future threats, their causes, and likely outcomes; hence, it provides good input to the military planning processes.
Source:
Global Trends 2025: A Transformed World
http://www.dni.gov/nic/NIC_2025_project.html

[135] Threats and Strategies for Addressing Climate Change in the Middle-East

Military Implications:
Relevant military personnel should consider reviewing the study for its potential input for peacebuilding in the Levant region.
Source:
Rising Temperatures, Rising Tensions; Climate change and the risk of violent conflict in the Middle East
http://www.iisd.org/pdf/2009/rising_temps_middle_east.pdf
Report warns of environment wars
http://www.gulf-times.com/site/topics/article.asp?cu_no=2&item_no=294712&version=1&template_id=37&parent_id=17
160 Syrian villages deserted 'due to climate change'
http://www.google.com/hostednews/afp/article/ALeqM5jXbS8a3ggiMm4ekludBbmWQMb-HQ

[136] *UNEP Year Book 2009*

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 2009. New Science and Developments in Our Changing Environment
http://www.unep.org/geo/yearbook/yb2009/

[137] *State of the World 2009*

Military Implications:

The report is a source of information on the implications of climate change, including security and adaptation, and thus aids planning improvement, resource prioritization, and preparedness.
Source:
State of the World 2009: Into a Warming World
http://www.worldwatch.org/node/5658

[138] Tools for Addressing Humanity's Growing Ecological Footprint

Military Implications:
The military should use the ecological footprint tools to assess and reduce their ecological impact.
Sources:
Global Footprint Network, World Footprint
http://www.footprintnetwork.org/en/index.php/GFN/page/world_footprint/
September 23 is Earth Overshoot Day
http://www.footprintnetwork.org/gfn_sub.php?content=overshoot
The heat is on – climate change gathers pace faster than scientists expected
http://www.panda.org/about_wwf/where_we_work/europe/news/index.cfm?uNewsID=148141
Where the wild things are
http://www.economist.com/research/articlesBySubject/displayStory.cfm?story_id=12332923&subjectID=348924&fsrc=nwl
Database:
http://biodiversityinfo.org/ibat/

[139] miniAtlas of Human Security

Military Implications:
Juxtaposing the maps of the human security atlas with the environmental stress-prone zones, might give important planning information on regions likely to suffer future conflict situations.
Source:
miniAtlas of Human Security
http://www.miniatlasofhumansecurity.info/en/

[140] Improved Governance Needed for Reducing Risks of Environmental Disaster

Military Implications:
These studies provide useful input for potential military strategies and collaboration with local governments on risk reduction actions in disaster and/or conflict prone areas, to prevent potential conflict exacerbation because of environmental disasters.
Sources:
2009 Global assessment report on disaster risk reduction: risk and poverty in a changing climate
http://www.preventionweb.net/english/hyogo/gar/report/index.php?id=9413
Global assessment report launched: Landmark report on poverty risk in a changing climate
http://www.preventionweb.net/english/professional/news/v.php?id=9425&pid:50
Secretary-General's remarks at ceremony launching The Global Assessment Report on Disaster Risk Reduction

http://www.un.org/apps/sg/sgstats.asp?nid=3858
The Global Network of Civil Society Organisations for Disaster Reduction
http://www.globalnetwork-dr.org/gndr/members.html
Studies Tie Disaster Risk to Urban Growth
http://www.nytimes.com/2009/05/17/world/17WebDisaster.html?ref=global-home
Report Reveals Climate Gap among Minorities, Poor in U.S.
http://college.usc.edu/geography/ESPE/documents/ReleaseClimateGap_FINAL.pdf

[141] Arab Mediterranean Governments' Environmental Security Cooperation

Military Implications:
Relevant environmental security military personnel should review the outcomes of this conference for possible cooperation and implications for military planning and operations in the region.
Sources:
Environmental experts advocate common Arab-Mediterranean vision
http://www.magharebia.com/cocoon/awi/xhtml1/en_GB/features/awi/features/2008/11/11/feature-01
Arab, Mediterranean governments urged to boost cooperation in environmental security
http://www.chinadaily.com.cn/world/2008-11/10/content_7188556.htm
Regional conference on environmental security opens
http://www.tap.info.tn/en/index.php?option=com_content&task=view&id=23393&Itemid=255
Arab Environment: Future Challenges
http://www.afedonline.org/afedreport/
State of the Arab environment 2008: 'A lot has been achieved, but much more is still needed'
http://www.dailystar.com.lb/article.asp?edition_id=1&categ_id=2&article_id=97278

[142] Water and Environmental Research Center to Be Established in UAE

Military Implications:
USCENTCOM personnel concerned with water and environmental security issues should contact the new center to exchange ideas and offer assistance to help improve water security for the region and anticipate potential changes in water relations and policies in the region.
Sources:
3 UAEU Centers of Excellence win NRF funding
http://www.uaeu.ac.ae/news/20081110_nrf_3_uaeu_centers.shtml
Universities to gain four new centres for academic research
http://gulfnews.com/nation/Education/10267860.html

[143] New Report Summarizes Pacific Environmental Threats and Solutions

Military Implications:
Military components responsible for oceanic environmental issues should review this150-page report for potentially useful information.

Sources:
Pacific Ocean Synthesis. Scientific Literature Review of Coastal and Ocean Threats, Impacts, and Solutions
http://www.centerforoceansolutions.org/PacificSynthesis.pdf
Research reveals Pacific Ocean threats and solutions
http://www.enn.com/top_stories/article/39989

Arctic Debate

[145] Arctic Council Declation, 2009

Military Implications:
[Similar to previous on this issue] Negotiations for clear international regulations concerning the Arctic region are necessary to continue to reduce potential conflicts, and define new military roles in the region for both national security and protection of the ecosystems. Relevant military personnel should cooperate with their counterparts in other countries and international organizations for developing adequate strategies, regulations, and enforcement procedures.
Sources:
The Tromsø Declaration ratified
http://arctic-council.org/article/2009/4/the_tromso_declaration_ratified
Arctic Council rejects EU's observer application
http://euobserver.com/9/28043/?rk=1
Oslo sets limit on Arctic seabed, short of North Pole
http://www.reuters.com/article/environmentNews/idUSTRE53E3X420090415
Arctic: competition or cooperation?
http://www.ruvr.ru/main.php?lng=eng&q=44085&cid=57&p=21.04.2009

[146] Resources Trigger Overlapping Claims for Maritime Area

Military Implications:
[Similar to previous on related issues] It is likely that discussions for clear international regulations concerning the Polar Regions and over new maritime areas will increase rapidly, opening the potential for new military roles in those regions 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:
Energy conflicts could bring military clashes, Russian security strategy warns
http://www.guardian.co.uk/world/2009/may/13/russia-security-strategy-energy-warning
Medvedev endorses national security strategy until 2020
http://www.itar-tass.com/eng/level2.html?NewsID=13932213&PageNum=0
The coldest war: Russia and U.S. face off over Arctic resources
http://www.dailymail.co.uk/news/article-1184291/The-coldest-war-Russia-U-S-face-Arctic-resources.html

Russia warns of war within a decade over Arctic oil and gas riches
http://www.timesonline.co.uk/tol/news/environment/article6283130.ece
70 states meet continental shelf deadline
http://www.dur.ac.uk/ibru/news/boundary_news/?itemno=7954&rehref=%2Fibru%2F&resubj=Boundary+news%20Headlines
More continental shelf claims submitted to the CLCS
http://www.dur.ac.uk/ibru/news/boundary_news/?itemno=7882&rehref=%2Fibru%2Fnews%2F&resubj=Boundary+news%20Headlines
Squaring off for a seabed scrap
http://www.economist.com/world/americas/displaystory.cfm?story_id=13611528
France seeks settlement to St-Pierre offshore claim
http://www2.canada.com/topics/news/story.html?id=1588566
China asserts sea border claims
http://news.bbc.co.uk/2/hi/asia-pacific/8047206.stm
Submissions, through the Secretary-General of the United Nations, to the Commission on the Limits of the Continental Shelf, pursuant to article 76, paragraph 8, of the UNCLS
http://www.un.org/depts/los/clcs_new/commission_submissions.htm
UK stakes claim to huge area of South Atlantic seabed
http://www.guardian.co.uk/world/2009/may/11/uk-falklands-argentina-un
Britain and Argentina dispute rights to seabed around the Falkland Islands
http://www.guardian.co.uk/uk/2009/apr/24/falklands-britain-argentina-dispute-seabed
Russia warns of war within a decade over Arctic oil and gas riches
http://www.timesonline.co.uk/tol/news/environment/article6283130.ece

147 New Arctic Maps Detail Geological Features

Military Implications:
Military personnel with Arctic responsibilities should review these maps to explore military applications and preparation for participation in future negotiations.
Sources:
New map of Arctic could point to Canadian gas, minerals
http://www.cbc.ca/money/story/2009/05/07/tech-geological-map-arctic-marc-st-onge.html
(See "External Links – Mirage Map Database")
Arctic's black gold mapped
http://www.nature.com/news/2009/090528/full/news.2009.527.html
Maritime jurisdiction and boundaries in the Arctic region
http://www.dur.ac.uk/ibru/resources/arctic/

148 Canada Enhances its Arctic Surveillance

Military Implications:
[Similar to previous on this issue] Negotiations for clear international regulations concerning the Arctic region are necessary to continue to reduce potential conflicts, and define new military roles in the region for both national security and protection of the ecosystems. Relevant military

personnel should cooperate with their counterparts in other countries and international organizations for developing adequate strategies, regulations, and enforcement procedures.
Sources:
Russia does not view Arctic as area of potential conflicts – Lavrov
http://www.interfax.com/3/490967/news.aspx
Government of Canada Announces Location of Satellite Reception Ground Stations for Polar Epsilon
http://www.marketwire.com/press-release/Department-Of-National-Defence-967526.html
Arctic: competition or cooperation?
http://www.ruvr.ru/main.php?lng=eng&q=44085&cid=57&p=21.04.2009

[149] Norway Defins Its Continental Shelf

Military Implications:
[Similar to previous on this issue] Negotiations for clear international regulations concerning the Arctic region are necessary to continue to reduce potential conflicts, and define new military roles in the region for both national security and protection of the ecosystems. Relevant military personnel should cooperate with their counterparts in other countries and international organizations for developing adequate strategies, regulations, and enforcement procedures.
Sources:
Oslo sets limit on Arctic seabed, short of North Pole
http://www.reuters.com/article/environmentNews/idUSTRE53E3X420090415
"Plenty Of Opportunities" From Arctic Thaw - Norway
http://planetark.org/wen/52632

[150] Potential NATO Military Presence in the Arctic

Military Implications:
[Similar to previous on the same issue] Negotiations for clear international regulations concerning the Arctic region are necessary. The potential for 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 for developing adequate strategies, regulations, and enforcement procedures.
Sources:
NATO chief wants military in Arctic as it thaws
http://www.msnbc.msn.com/id/28907448/
Defence warns of climate conflict
http://www.smh.com.au/news/environment/global-warming/defence-warns-of-climate-conflict/2009/01/06/1231004021036.html
National Security Presidential Directive and Homeland Security Presidential Directive NSPD-66/HSPD-25, January 9, 2009
http://www.fas.org/irp/offdocs/nspd/nspd-66.htm
New policy emphasizes U.S. interests in Northwest Passage

http://www.thestar.com/news/canada/article/569679
Who Owns Rights to Melting Arctic?
http://www.businessweek.com/bwdaily/dnflash/content/jan2009/db20090127_954391.htm

[151] Arctic Needs New International Regulations
Military Implications:
[Similar to previous on the same issue] Relevant military personnel should contact the UNU to get a copy of the report to identify any new military roles in the region.
Sources:
International Symposium: Looking beyond the International Polar Year. Emerging and re-emerging issues in international law and policy in the Polar Regions
http://www.ias.unu.edu/sub_page.aspx?catID=8&ddlID=620
Thaw Of Polar Regions May Need New UN Laws – Experts
http://www.planetark.org/dailynewsstory.cfm/newsid/50115/story.htm
President Medvedev threatens Russian Arctic annexation
http://www.timesonline.co.uk/tol/news/world/europe/article4773567.ece
Russia to cement claim over resource-rich Arctic
http://www.neurope.eu/articles/89848.php
Unexplored Arctic region to be mapped
http://www.physorg.com/news139663090.html
Melting ice cap pushes Arctic up EU agenda
http://euobserver.com/9/26723/?rk=1

[152] European Parliament Adopted Resolution on Arctic Governance
Military Implications:
[Similar to previous on the same issue] Negotiations for clear international regulations concerning the Arctic region are accelerating. 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 for developing adequate strategies, regulations, and enforcement procedures.
Sources:
European Parliament resolution of 9 October 2008 on Arctic governance
http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+TA+P6-TA-2008-0474+0+DOC+XML+V0//EN&language=EN
Arctic governance: European Parliament deeply concerned about the effects of climate change
http://www.europarl.europa.eu/news/expert/briefing_page/39049-282-10-41-20081008BRI39048-08-10-2008-2008/default_p001c014_en.htm
Consensus on Arctic initiatives
http://arctic-council.org/article/2008/9/concensus_on_arctic_initiatives

[153] EU Arctic Policy Guidelines
Military Implications:

[Similar to previous on the same issue] Negotiations for clear international regulations concerning the Arctic region are accelerating. The potential for 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 for developing adequate strategies, regulations, and enforcement procedures.
Sources:
The EU and the Arctic region
http://ec.europa.eu/maritimeaffairs/arctic_overview_en.html
Commission green-lights industrialisation of Arctic
http://euobserver.com/9/27152/?rk=1
Shippers, oil companies gauge benefits of less Arctic ice
http://www.adn.com/news/alaska/story/603373.html
EU makes pitch for 'unified' Arctic research
http://www.terradaily.com/reports/EU_makes_pitch_for_unified_Arctic_research_999.html
Europe joins international contest for Arctic's resources
http://www.guardian.co.uk/world/2008/nov/21/arctic-energy-eu
Europe takes first step towards 'Arctic policy' to protect energy security
http://www.guardian.co.uk/environment/2008/nov/20/poles-arctic-europe
Europe's Arctic adventure - The new cold rush for resources
http://euobserver.com/880/27035

154 Nordic Countries Alliances for Addressing Arctic Issues

Military Implications:
[Similar to previous on this issue] Negotiations for clear international regulations concerning the Arctic region are necessary. The potential for 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 for developing adequate strategies, regulations, and enforcement procedures.
Sources:
Speech by NATO Secretary General Jaap de Hoop Scheffer on security prospects in the High North
http://www.nato.int/docu/speech/2009/s090129a.html
Nordic Cooperation on Foreign and Security Policy. Proposals presented to the extraordinary meeting of Nordic foreign ministers in Oslo on 9 February 2009
http://www.regjeringen.no/upload/UD/Vedlegg/nordic_report.pdf
Nordic countries to pool troops and intelligence
http://euobserver.com/9/27574/?rk=1
Nordic military alliance to challenge Russia in Arctic
http://www.russiatoday.com/news/news/37071

155 Russian Security Unit and Draft Law for Reinforcing Arctic Claims

Military Implications:

[Similar to previous on this issue] Negotiations for clear international regulations concerning the Arctic region are necessary to continue to reduce potential conflicts, and define new military roles in the region for both national security and protection of the ecosystems. Relevant military personnel should cooperate with their counterparts in other countries and international organizations for developing adequate strategies, regulations, and enforcement procedures.
Sources:
Russia plans Arctic security unit
http://www.marketwatch.com/news/story/russia-plans-arctic-security-unit/story.aspx?guid={66566728-4484-46AD-BB8C-6EC140149C97}&dist=msr_1
Russia says won't stand still in race for Arctic
http://www.reuters.com/article/environmentNews/idUSTRE52P5NS20090326?pageNumber=1&virtualBrandChannel=0
Canada won't be 'bullied' by Russia's plans to protect Arctic interests: Cannon
http://www.google.com/hostednews/canadianpress/article/ALeqM5irfclfyLnfcwNnVS84Bw9CxVv7mQ
Global warming sparks new ice-cold war: Russia plans elite army unit in race for Arctic resources
http://www.dailymail.co.uk/news/worldnews/article-1165318/Global-warming-sparks-new-ice-cold-war-Russia-plans-elite-army-unit-race-Arctic-resources.html
NEW HORIZONS. Finding a path away from NATO's de-solidarisation
http://www.natonewhorizons.org/NewHorizons-DigitalEdition.pdf (14 MB file)

[156] The Debate over Strategic Control of the Arctic is Heating Up
Military Implications:
[Similar to all items on this issue] Negotiations for clear international regulations concerning the Arctic region should be accelerated, to counter any possible escalation of unfriendly attitudes. In any event, 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:
Northeast and Northwest Passages Both Free of Ice
http://www.spiegel.de/international/world/0,1518,574815,00.html
PM pledges wider Arctic patrols
http://www.theglobeandmail.com/servlet/story/LAC.20080828.ARCTIC28//TPStory/Environment
more than 200 cruise ships circled Greenland in 2007, up from 27 in 2004.
http://www.nytimes.com/2008/08/17/world/europe/17arctic.html?_r=1&oref=slogin
Rush to Arctic as warming opens oil deposits
http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2008/08/12/MN5R1290QE.DTL&hw=Coile&sn=001&sc=1000
Russia's Arctic ambitions challenged
http://www.ft.com/cms/s/0/9d1a80e0-6c7d-11dd-96dc-0000779fd18c.html?nclick_check=1
A Push to Increase Icebreakers in the Arctic
http://www.nytimes.com/2008/08/17/world/europe/17arctic.html?_r=1&oref=slogin
Russia leads scramble for Arctic
http://www.telegraph.co.uk/news/worldnews/europe/russia/2570295/Russia-leads-scramble-for-Arctic.html

U.S. ship heads for Arctic to define territory
http://www.reuters.com/article/topNews/idUSN1138192220080811?feedType=RSS&feedName=topNews&rpc=22&sp=true
US mission to Arctic will lay claim to gas reserves
http://www.telegraph.co.uk/news/worldnews/northamerica/usa/2549271/US-mission-to-Arctic-will-lay-claim-to-gas-reserves.html
The Race To Own The Top Of The World
http://www.arcticoag.com/documents/press.html
Ice Free
http://www.nytimes.com/2008/07/27/magazine/27wwln-phenom-t.html?_r=1&oref=slogin
Chief scientist: China's North Pole trip focuses only on climate studies
http://english.peopledaily.com.cn/90001/90781/90879/6449077.html
New map aims to help battle for Arctic territories
http://www.reuters.com/article/environmentNews/idUSL562407320080806?sp=true
Maritime jurisdiction and boundaries in the Arctic region (map)
http://www.dur.ac.uk/ibru/resources/arctic/

[157] Greenland Moving Towards Independence

Military Implications:
The likelihood of potential new roles of coalition forces 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:
Greenland takes step toward independence from Denmark
http://www.telegraph.co.uk/news/worldnews/europe/greenland/5594140/Greenland-takes-step-toward-independence-from-Denmark.html
Divorce up north?
http://www.economist.com/daily/news/displaystory.cfm?story_id=12696845
Greenland Takes a Step Towards Autonomy
http://www.spiegel.de/international/europe/0,1518,592880,00.html

NATURAL DISASTERS AND SCIRNTIFIC EVIDENCES

[159] New 2009 Terminology on Disaster Risk Reduction

Military Implications:
Given the increasingly international nature of relief efforts, using a common “language” is important. The “guide” should be widely distributed to relevant military personnel.
Source:
UNISDR Terminology on Disaster Risk Reduction (2009)
http://www.unisdr.org/eng/library/lib-terminology-eng.htm

Scientific Evidences and Potential Consequences

Military Implications:
[Same as other on similar issues] The military should identify all its resources and programs for reducing GHGs and responding to effects of climate change, update information continuously, forecast how it might be called upon for both mitigation and adaptation, and perform a gap analysis in anticipation of future requests. International discourse over climate change increases the rate of emergence of international policies trying to tackle the causes and develop strategies to mitigate climate change effects.

Sources (listed by month):

[161] **June 2009**
Climate Change Picks Pace New IPCC Report Warns
http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=589&ArticleID=6225&l=en&t=long
Press Conference by International Federation of Red Cross and Red Crescent Societies to Launch 'World Disasters Report 2009'
http://www.un.org/News/briefings/docs/2009/090616_ICRC.doc.htm
Deadly heat
http://www.salon.com/env/feature/2009/05/30/climate_change_crisis/#
Climate change study counts high human toll
http://www.ft.com/cms/s/0/4f408284-4c79-11de-a6c5-00144feabdc0.html?nclick_check=1
Climate change study counts high human toll
http://www.ft.com/cms/s/0/4f408284-4c79-11de-a6c5-00144feabdc0.html?nclick_check=1
Korea moving toward a subtropical climate
http://www.koreaherald.co.kr/NEWKHSITE/data/html_dir/2009/06/15/200906150007.asp

[162] **May 2009**
Copenhagen the Focus as Australia Shows Effects of Climate Change
http://www.theepochtimes.com/n2/content/view/17301/
Russia makes major shift in climate policy
http://www.nature.com/news/2009/090526/full/news.2009.506.html?s=news_rss
Assessment Report on Climate Change and Its Consequences in Russian Federation
http://climate2008.igce.ru/v2008/pdf/resume_ob_eng.pdf

[163] **April 2009**
EU: Earth Warming Faster
http://planetark.org/wen/52377

World will not meet 2C warming target, climate change experts agree
http://www.guardian.co.uk/environment/2009/apr/14/global-warming-target-2c
Right to Survive
http://www.oxfam.org/en/policy/right-to-survive-report
Climate change will overload humanitarian system, warns Oxfam
http://www.guardian.co.uk/environment/2009/apr/21/climate-change-natural-disasters

[164] **March 2009**
Planet faces 'dangerous climate change'
http://www.watoday.com.au/world/planet-faces-dangerous-climate-change-20090314-8ydi.html?page=-1
Severe global warming will render half of world's inhabited areas unlivable, expert warns
http://www.guardian.co.uk/environment/2009/mar/12/global-warming-temp-rise-population
Scientist: Warming Could Cut Population to 1 Billion
http://dotearth.blogs.nytimes.com/2009/03/13/scientist-warming-could-cut-population-to-1-billion/
Wind pattern change may intensify global warming
http://www.thaindian.com/newsportal/sci-tech/wind-pattern-change-may-intensify-global-warming_100166453.html
Scientists are grim, economists more optimistic about climate change's effects
http://www.nytimes.com/cwire/2009/03/13/13climatewire-scientists-see-more-grim-effects-of-climate--10121.html
Lower Increases In Global Temperatures Could Lead To Greater Impacts Than Previously Thought, Study Finds
http://www.sciencedaily.com/releases/2009/02/090223221425.htm

[165] **February 2009**
Why Global Warming May Be Fueling Australia's Fires
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MIGRATION TRIGGERED BY ENVIRONMENTAL CAUSES

[173] **Progress on Defining Environmental Refugees**

Military Implications:
Since militaries around the world are likely to be called on to respond to (if not help prevent) increasing numbers of environmental migrants, the military community should participate in the design of an eventual international framework for addressing global displacement and migration; continue to improve its ability to monitor possible causes of refugee flows and preventive measures; and continue to cooperate with civilian agencies in preparing contingency plans.
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http://www.efmsv2008.org/?menu=41

[174] Environmental Refugees Cyberseminar Revealing Difficulties of Defining Environmental Refugees

Military Implications:
Relevant military personnel should consider studying the cyberseminar papers due to the richness and comprehensiveness of information. Most probably, such academic debates are setting the stage for future policies and regulations concerning the growing number of environment-triggered displacements.
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Climate Refugees Trends

Military Implications:
[Same as other on similar issues] The military should identify all its resources and programs for reducing GHGs and responding to effects of climate change, update information continuously, forecast how it might be called upon for both mitigation and adaptation, and perform a gap analysis in anticipation of future requests. International discourse over climate change increases the rate of emergence of international policies trying to tackle the causes and develop strategies to mitigate climate change effects.

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Rising Sea Levels

Military Implications:
[Same as other on similar issues] The military should identify all its resources and programs for reducing GHGs and responding to effects of climate change, update information continuously, forecast how it might be called upon for both mitigation and adaptation, and perform a gap analysis in anticipation of future requests. International discourse over climate change increases the rate of emergence of international policies trying to tackle the causes and develop strategies to mitigate climate change effects.

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MELTING SEA ICE AND GLACCIERS

Military Implications:
[Same as other on similar issues] The military should identify all its resources and programs for reducing GHGs and responding to effects of climate change, update information continuously, forecast how it might be called upon for both mitigation and adaptation, and perform a gap analysis in anticipation of future requests. International discourse over climate change increases the rate of emergence of international policies trying to tackle the causes and develop strategies to mitigate climate change effects.

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FOOD AND FRESHWATER

Food and Freshwater Scarcity Issues
Military Implications:
[Same as other on similar issues] The military should identify all its resources and programs for reducing GHGs and responding to effects of climate change, update information continuously, forecast how it might be called upon for both mitigation and adaptation, and perform a gap analysis in anticipation of future requests. International discourse over climate change increases the rate of emergence of international policies trying to tackle the causes and develop strategies to mitigate climate change effects.

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[220] Water-related Rights and Security Addressed by 5th World Water Forum

Military Implications:
Just as major military resources supported the development and deployment of nuclear weapons as a deterrent to war, so too consideration should be given to adding major resources to support development and deployment of water solutions to prevent water scarcity-induced wars. Military personnel with environmental security responsibilities should consider the World Water Forum's recommendations, and explore collaboration possibilities with governments for designing preventive policies and strategies. Also, it should investigate how the recognition of access to clean water as a human right (which is gaining increasing global support and is already adopted by some countries) would affect military-to-military program priorities and training.
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[221] Central Asian Water Security Tensions Continue

Military Implications:
If not already existing, a collective intelligence system might be created concerning strategic rivers around the world that have multi-country control and where conflicts are possible, allowing for continuous monitoring and potential conflict prevention strategies, so that lessons from one water security situation can be compared with others in providing early warning and strategic input to decision makers. NATO and other allied military forces, together with the Environment and Security (ENVSEC) Program and possibly OSCE, should intensify efforts for helping negotiations for design and implementation of a water management and cooperation framework in the region before tensions increase to a failure point.
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[222] Addressing Potential Business-related Water Scarcity Issues

Military Implications:
The report is an additional source of information on different industries' water footprints, and their potential future consequences both for supply and for addressing water stress issues.
Sources:
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[223] Forums Discuss Water-Related Security Issues

Military Implications:
Outcomes of such forums should be reviewed for potential additions to policies, training, and plans to help prevent, contain, and resolve water-related conflicts.
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[224] Global Plan to Address Freshwater Supplies Negotiated

Military Implications:
Since water tables are falling on all continents and 40% of the world gets their water from watersheds controlled by two or more countries, improving fresh water availability can reduce the potential for future conflicts. Water experts from the military should attend the Forum to offer knowledge and to find opportunities for collaboration to prevent water-related conflict. Experts should also report back on new strategies, concepts, and potential regulations to improve global water governance.
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[225] Nationwide Health Information Network Could Help in Environmental Emergencies

Military Implications:
Military personnel concerned with measures for handling environmental emergencies with health components should familiarize themselves with this work in order to take its capabilities into account in their planning.
Source:
A look to the future
http://www.physorg.com/news141397611.html

[226] International Response to Contain Influenza A(H1N1) Outbreak

Military Implications
In addition to monitoring the situation and protecting the health of military personnel and contractors, the military should follow this development to identify "lessons learned" for addressing future pandemics, help catalyze global efforts to strengthen implementation and compliance with IHR 2005, and improve contingency plans and training for possible future bioterrorist attacks.
Sources:
WHO influenza A(H1N1) information
http://www.who.int/csr/disease/swineflu/en/index.html
Disease and Terror. The swine-flu outbreak caught health officials completely by surprise—just as a bioterror attack would.
http://www.newsweek.com/id/195422
US military 'monitoring' flu outbreak
http://www.breitbart.com/article.php?id=CNG.8282347267271b64646e51f83dc4437f.501&show_article=1
Universal Flu Vaccine in Development
http://www.ens-newswire.com/ens/apr2009/2009-04-27-094.asp
France calls for EU Mexico travel ban as swine flu alert level raised
http://euobserver.com/9/28041/?rk=1
UN notches up swine flu pandemic alert to level 5
http://www.un.org/apps/news/story.asp?NewsID=30638&Cr=swine&Cr1=
World Health Organization Raises Swine Flu Alert Leve
http://www.nytimes.com/2009/04/30/health/30flu.html?_r=1&th&emc=th
WHO, Swine influenza
http://www.who.int/mediacentre/news/statements/2009/h1n1_20090427/en/index.html

WHO raises swine flu alert level
http://news.bbc.co.uk/2/hi/americas/8021827.stm
The Swine Flu Outbreak and International Law
http://campaign.constantcontact.com/render?v=001as_XC_VpxF7CLyZ2X2VYRs4rysOEo2iRtEdqHxcq-NWos8DsYAt3JSbED7uyNYcCEWto0Zr-E4_NOyrIXOOfvl5XzUQWefQhVchT2DcLfQZ9q5XaS69T6owS9btggXSXycRM0QJbWZs4626V_86G2g%3D%3D
World Animal Health Body Says Swine Flu Wrong Name
http://planetark.org/wen/52643
International unity key to tackling swine flu threat, Ban says
http://www.un.org/apps/news/story.asp?NewsID=30609&Cr=virus&Cr1=
France calls for EU Mexico travel ban as swine flu alert level raised
http://euobserver.com/9/28041/?rk=1

[227] Global Influenza Pandemic Declared

Military Implications:
[Same as previous on this issue] In addition to monitoring the situation and protecting the health of military personnel and contractors, the military should follow this development to identify "lessons learned" for addressing future pandemics, help catalyze global efforts to strengthen implementation and compliance with IHR 2005, and improve contingency plans and training for possible future bioterrorist attacks.
Sources:
Global Influenza Pandemic Declared
http://www.ens-newswire.com/ens/jun2009/2009-06-11-02.asp
US passes million swine flu cases
http://news.bbc.co.uk/2/hi/americas/8122262.stm

Health-related Climate Change Consequences, Trends and Actions

Military Implications:
[Same as other on similar issues] The military should identify all its resources and programs for reducing GHGs and responding to effects of climate change, update information continuously, forecast how it might be called upon for both mitigation and adaptation, and perform a gap analysis in anticipation of future requests. International discourse over climate change increases the rate of emergence of international policies trying to tackle the causes and develop strategies to mitigate climate change effects.

Sources:

[229] June 2009

Running a Temperature
http://www.foreignpolicy.com/articles/2009/06/24/running_a_temperature_0

Managing the Health effects of Climate Change
http://www.thelancet.com/climate-change
Climate change: The biggest global-health threat of the 21st century
http://www.ucl.ac.uk/news/news-articles/0905/09051501/
Climate 'biggest health threat'
http://news.bbc.co.uk/1/hi/sci/tech/8049061.stm

[230] **May 2009**
World Health Assembly closes with resolutions on public health
http://www.who.int/mediacentre/news/releases/2009/world_health_assembly_20090522/en/index.html
Protecting the health of vulnerable people from the humanitarian consequences of climate change and climate related disasters
http://unfccc.int/resource/docs/2009/smsn/igo/047.pdf
Protecting Health from Climate Change: Global research priorities
http://www.who.int/phe/news/madrid_report_661_final_lowres.pdf

[231] **April 2009**
World Health Day
http://www.who.int/world-health-day/2009/en/index.html

[232] **March 2009**
INTERVIEW-Changing climate boosts dengue cases -WHO official
http://www.reuters.com/article/latestCrisis/idUSSP402739
Changing climate increases West Nile threat in U.S.
http://wwwp.dailyclimate.org/tdc-newsroom/west-nile/Changing-climate-increases-West-Nile-threat-in-U.S
Health sector will bear brunt of global crises, says top UN health official
http://www.un.org/apps/news/story.asp?NewsID=30248&Cr=health&Cr1=financial+crisis
World Water Day 2009
http://www.unwater.org/worldwaterday/flashindex.html
World Water Day Message from Achim Steiner
http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=573&ArticleID=6106&l=en&t=long
Health hazards demand stronger climate change measures, argues UN agency
http://www.un.org/apps/news/story.asp?NewsID=30155&Cr=climate+change&Cr1=health

[233] **February 2009**
Climate and Health Work Plan:
http://www.who.int/gb/ebwha/pdf_files/EB124/B124_11-en.pdf
Climate change preparedness as part of the assessment of health security and crisis management capacity

http://www.euro.who.int/globalchange/country/20090212_1
Global change and health at the 2010 Fifth Ministerial Conference on Environment and Health
http://www.euro.who.int/globalchange/country/20090112_1
WHO/Europe to Propose a European Strategy on Health and Climate Change at 2010 Fifth Ministerial Conference on Environment and Health
http://www.climate-l.org/2009/02/whoeurope-to-propose-a-european-strategy-on-health-and-climate-change-at-2010-fifth-ministerial-conf.html

ENERGY SECURITY

[235] New International Renewable Energy Agency Opens in January

Military Implications:
Military personnel seeking to implement the Army Strategy for the Environment should explore potential relations with IRENA. Although its mandate is primarily consulting on renewable energy technology, it is reasonable to assume that IRENA will also address policy and regulatory issue for global energy security.
Sources:
IRENA website: www.irena.org
Promoting IRENA for a Stable Climate. Joint Press Release Germany-Denmark-Spain
http://www.irena.org/downloads/Press/PM_SideEvent_IRENA_081211_EN.pdf
Japan won't join intl eco-agency
http://www.yomiuri.co.jp/dy/national/20081231TDY02306.htm

[236] Energy and Environmental Security Increasingly Addressed Together

Military Implications:
In addition to continuously improving its energy efficiency policies, the military should seek cooperation with its counterparts and seek further opportunities to apply the Army Strategy for the Environment in energy programs.
Sources:
China, U.S. agree to add climate, security topics to talks
http://www.chicagotribune.com/news/nationworld/chi-clinton-china-sliderfeb22,0,4463769.story
Clinton, Chinese add environmental and security issues to economic talks
http://www.latimes.com/news/nationworld/washingtondc/la-fg-clinton-china22-2009feb22,0,2814624.story
Obama Agrees To Work With Canada On Clean Energy
http://planetark.org/wen/51741
The Oil Sands: Energy Security v. Climate Change
http://www.kciinvesting.com/articles/9852/1/The-Oil-Sands-Energy-Security-v-Climate-Change/Page1.html
'Energy Efficiency Resource Standard' Would Reduce Energy Costs, Global Warming Pollution, Avoid New Power Plants, Says Alliance

http://news.prnewswire.com/ViewContent.aspx?ACCT=109&STORY=/www/story/02-04-2009/0004966695&EDATE
U.S. May Set Greenhouse Gas Standard for Cars
http://www.washingtonpost.com/wp-dyn/content/article/2009/02/23/AR2009022302575.html?hpid=topnews

[237] An International Energy and Environmental Security Foresight Network
Military Implications:
If not already involved, senior military environmental security and energy personnel should seek inclusion in the EESE Project.
Source:
Canada may join U.S.-led energy, environment security project
http://canadianpress.google.com/article/ALeqM5idqDzQ-rStLqmwfoW2VXiMY7E7UQ
Global Intelligence; Developing a Globally Networked Intelligence Capacity (power point presentation)
http://www.dniopensource.org/Conference/files/Carol%20Dumaine%20FINAL%2009-12-08.ppt
Support Grows for Integrating Environment, Energy, Economy, Security in U.S. Government
http://newsecuritybeat.blogspot.com/2008/11/support-grows-for-integrating.html

[238] Suggestions for Addressing Energy and National Security
Military Implications:
The Journal of Energy Security is a good resource for geopolitical analysis, offering an authoritative international view on issues related to environmental and energy security.
Source:
Energy Security as National Security: Defining Problems Ahead of Solutions
http://www.ensec.org/index.php?option=com_content&view=article&id=183:energy-security-as-national-security-defining-problems-ahead-of-solutions1&catid=92:issuecontent&Itemid=341

[239] *World Energy Outlook 2008*
Military Implications:
The report might provide inputs on future energy security issues and possible resource-related disputes, as well as hints on potential scenarios concerning the post-2012 climate change pact.
Source:
World Energy Outlook 2008
http://www.worldenergyoutlook.org/

PREVENTION AND ADAPTATION

[241] UN and Governments of Latin America and the Caribbean Met to Improve Disaster Anticipation and Response System
Military Implications:

As part of its actions for addressing security in the region, the military with responsibility in Latin American and the Caribbean (USSOUTHCOM) should (if not already doing so) explore improvements for cooperation with these international, national, and regional organizations to address disaster preparedness and response—not only to help these organizations, but also to improve military relief actions, and seek participation in the 2009 Brazil meeting.
Sources:
UN Aid Chief Urges More Coordinated Disaster Relief in Latin America, Caribbean
http://www.un.org/apps/news/story.asp?NewsID=28031&Cr=Caribbean&Cr1=Hurricane
First Regional Meeting on Enhancing International Humanitarian Partnerships Concludes
http://ochaonline.un.org/OchaLinkClick.aspx?link=ocha&docId=1094144
USSOUTHCOM
http://www.southcom.mil/AppsSC/index.php

[242] Conference on Resilience Concepts for Large-Scale Disasters

Military Implications:
Representatives from the Office of the Secretary of Defense and the National Defense University are already involved in planning the meeting; however, representatives from the Army Environmental Policy Institute and those they recommend should consider participating in the conference.
Sources:
2008 U.S. Resilience Summit
http://humanitariantechnet.asu.edu/node/6
Meetings and correspondence with Michael.D.McDonald@mac.com and Millennium Project Director, Jerome Glenn (jglenn@igc.org)

Regional Initiatives

Military Implications:
[Same for all on similar 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: (Listed by month in reverse chronological order)

[244] June 2009

UNISDR release: http://www.unisdr.org/
Chair's summary:
http://www.preventionweb.net/globalplatform/2009/background/documents/GP09-Chair%27s-Summary.pdf
GEF STAP Recommendations:

http://www.gefweb.org/uploadedFiles/Documents/Council_Documents__(PDF_DOC)/GEF_35/C.35.13_STAP.pdf
SOUTHERN AFRICA: Climate proofing the Zambezi
http://www.irinnews.org/Report.aspx?ReportId=85013
Zambezi River Basin Initiative
http://www.ifrc.org/Docs/pubs/disasters/160400-Zambezi_River_Project_LR3.pdf
Gordon Brown puts $100bn price tag on climate adaptation
http://www.guardian.co.uk/environment/2009/jun/26/gordon-brown-climate-adaptation-cost

[245] **May 2009**
Environment-Led Green Revolution Key to Future Food Security in Africa
http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=585&ArticleID=6170&l=en&t=long
The Environmental Food Crisis: The Environment's Role in Averting Future Food Crises:
http://www.grida.no/publications/rr/food-crisis/
Anchoring Agriculture within a Copenhagen Agreement A Policy brief for UNFCCC parties by FAO
http://www.fao.org/forestry/foris/data/nrc/policy_brief_sbstabonn.pdf

[246] **April 2009**
Living with climate change in Europe
http://ec.europa.eu/environment/climat/adaptation/index_en.htm
White paper - Adapting to climate change: towards a European framework for action
http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2009:0147:FIN:EN:HTML
Adapting to climate change: the European Union must prepare for the impacts to come
http://europa.eu/rapid/pressReleasesAction.do?reference=IP/09/519&format=HTML&aged=0&language=EN&guiLanguage=en
International conference on gender and disaster risk reduction
http://www.unisdr.org/english/events/v.php?id=8024
'21st Century multi-stakeholder partnership' best way to mitigate growing scourge of disasters, build safer world, says Deputy Secretary-General in Beijing remarks
http://www.un.org/News/Press/docs/2009/dsgsm454.doc.htm

[247] **March 2009**
NEW HORIZONS. Finding a path away from NATO's de-solidarisation (14 MB file)
http://www.natonewhorizons.org/NewHorizons-DigitalEdition.pdf
Asia-Pacific nations to boost efforts to curb disaster risk – UN
http://www.un.org/apps/news/story.asp?NewsID=30314&Cr=Disaster&Cr1
Asia-Pacific Countries See the Need to Cooperate to Reduce Risk of Disasters
http://www.unescap.org/unis/press/2009/mar/g24.asp

Oslo to host cities climate change conference (UN HABITAT Press Release)
http://www.unhabitat.org/content.asp?cid=6352&catid=5&typeid=6&subMenuId=0

[248] **February 2009**
Climate Change and Ecosystem Management
http://www.iucn.org/about/work/initiatives/climate_news/_/climate_change_and_ecosystem_management/
New Global Climate Adaptation Network in the Works
http://www.ens-newswire.com/ens/feb2009/2009-02-05-01.asp
Rich nations failing to meet climate aid pledges
http://www.guardian.co.uk/environment/2009/feb/20/climate-funds-developing-nations
Pacific ICT Ministerial Forum: "Connecting the Unconnected"
http://www.itu.int/ITU-D/asp/CMS/Events/2009/PacMinForum/PacMinForum.asp
ITU launches new partnerships for ICT development in the Pacific
http://www.itu.int/newsroom/press_releases/2009/05.html

[249] **December 2008**
Poorest need $1 bln for urgent climate projects
http://planetark.org/wen/50865
UN emergency response fund this year reaches its $450 million target for first time
http://www.un.org/apps/news/story.asp?NewsID=29439&Cr=cerf&Cr1=
U.N. climate adaptation fund running out of cash
http://www.alertnet.org/thenews/newsdesk/L6349998.htm
Asian nations focus on disaster risk reduction as UN-backed meeting opens in Malaysia
http://www.un.org/apps/news/story.asp?NewsID=29149&Cr=Natural+disaster&Cr1=
Rise in extreme weather events fuelling demand for UN disaster management expertise
http://www.un.org/apps/news/story.asp?NewsID=29405&Cr=UNDAC&Cr1=
Slow Progress in Poznan While Climate Threats Mount
http://www.ens-newswire.com/ens/dec2008/2008-12-13-01.asp

[250] **November 2008**
The Dutch adaptation scan for local authorities
http://www.cosis.net/abstracts/EMS2008/00647/EMS2008-A-00647.pdf
Indonesia launches tsunami warning system
http://www.guardian.co.uk/world/2008/nov/11/indonesia-tsunami-warning-system
From the village green to the village blue
http://www.guardian.co.uk/environment/2008/nov/26/defra-flood-town-plans
Big changes could come for little Shishmaref
http://www.ktuu.com/Global/story.asp?S=9409598

California bulks up defenses against tide of global warming
http://www.sacbee.com/378/story/1422503.html
Leaders team up to combat natural disasters
http://www.theaustralian.news.com.au/story/0,25197,24695576-2702,00.html
Indonesia 'crucial' in weathering climate storm
http://www.theage.com.au/national/indonesia-crucial-in-weathering--climate-storm-20081122-6eip.html
EU pledges climate change help
http://tvnz.co.nz/view/page/536641/2323222
Sea surges could uproot millions in Nigeria megacity
http://www.reuters.com/article/environmentNews/idUSTRE4AI74G20081119?sp=true
Crimson tide: Rise in sea level changing Gujarat's contours
http://www.expressindia.com/latest-news/crimson-tide-rise-in-sea-level-changing-gujarats-contours/383315/
Extreme events claims mounting
http://www.theaustralian.news.com.au/story/0,25197,24546515-11949,00.html
A Low Country Seeks Higher Ground
http://www.nytimes.com/2008/11/07/world/europe/07dutch.html?_r=1
APEC declaration
http://www.apec.org/etc/medialib/apec_media_library/downloads/news_uploads/2008/aelm/aelm.Par.0002.File.tmp/08_aelm_LeadersStatement.pdf
Climate Change-Latin America: Frightening Numbers
http://www.ipsnews.net/news.asp?idnews=44818

CLIMATE MODELING

Military Implications:
[Same for all on similar 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:

[252] May 2009
Climate change odds much worse than thought
http://web.mit.edu/newsoffice/2009/roulette-0519.html
Global warming of 7C 'could kill billions this century'
http://www.telegraph.co.uk/earth/earthnews/5357725/Global-warming-of-7C-could-kill-billions-this-century.html
Global warming could be twice as bad as forecast
http://www.reuters.com/article/environmentNews/idUSTRE54I6PF20090519

[253] February 2009

Model Sees Severe Climate Change Impact By 2050
http://planetark.org/wen/51637

[254] **December 2008**
Climate change models. Likely effects of four emission reduction models
http://www.metoffice.gov.uk/research/hadleycentre/news/emissions_270908.pdf
Met Office warn of 'catastrophic' rise in temperature
http://www.newscientist.com/article/dn16307-arctic-melt-20-years-ahead-of-climate-models.html

[255] **July-August 2008:**
Climate war games. Role-play negotiations test the outcomes of global warming
http://www.nature.com/news/2008/080805/full/454673a.html (by subscription only; full text below)
Scientists Test System to Forecast Flash Floods along Colorado's Front Range
http://www.nsf.gov/news/news_summ.jsp?cntn_id=111932&org=NSF&from=news
Melting polar ice-caps could bring more droughts to Africa
http://ec.europa.eu/environment/integration/research/newsalert/pdf/118na1.pdf

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 2008

Marine Environment

[259] **New International Agreement on Recycling of Ships**
Military Implications:
The military should ensure that dismantling of its vessels complies with the requirements of the Convention.
Sources:
New international convention adopted to ensure safe and environmentally sound ship recycling
http://www.imo.org/About/mainframe.asp?topic_id=1773&doc_id=11368
Agreement on Ship Recycling Wins Wide Support
http://www.nytimes.com/2009/05/15/business/energy-environment/15ship.html

[260] Tougher Global Limits Imposed on Air Pollution from Large Ships

Military Implications:
The Navy should be prepared to comply with new international anti-pollution regulations that may not exempt military craft. Transportation contract managers will need to prepare for these changes, with respect to bidder selection.
Sources:
Major progress on air pollution, ship recycling and ballast water management at IMO environment meeting
http://www.imo.org/Newsroom/mainframe.asp?topic_id=1709&doc_id=10268
IMO environment meeting finalizes ships recycling convention for adoption in 2009
http://www.imo.org/Newsroom/mainframe.asp?topic_id=1709&doc_id=10263
IMO environment meeting adopts revised regulations on ship emissions
http://www.imo.org/Newsroom/mainframe.asp?topic_id=1709&doc_id=10262
Tough Global Limits Imposed on Air Pollution from Large Ships
http://www.ens-newswire.com/ens/oct2008/2008-10-13-01.asp

[261] UN Convention on the Protection of the Underwater Cultural Heritage will Enter into Force in January 2009

Military Implications:
Relevant military personal should consider the eventual implications for their activities of the rules outlined by the Convention and its Annex.
Sources:
Convention on the Protection of the Underwater Cultural Heritage will enter into force in January 2009
http://portal.unesco.org/en/ev.php-URL_ID=43663&URL_DO=DO_TOPIC&URL_SECTION=201.html
Convention on the Protection of the Underwater Cultural Heritage
http://unesdoc.unesco.org/images/0012/001260/126065e.pdf

[262] Coral Triangle May Get Regional Protection

Military Implications:
The military should stay in contact with this program, in order to take possible future related environmental restrictions into account in planning and conducting activities in the area.
Source:
Asia's Coral Triangle could get protection
http://www.msnbc.msn.com/id/27340356/

[263] World Database on Marine Protected Areas

Military Implications:
The World Database on Marine Protected Areas is a useful tool for the Navy to help compliance with protected areas regulations.

Sources:
World Database on Marine Protected Areas: http://www.wdpa-marine.org
UNEP launches new online system to view and study the world's marine protected areas
http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=589&ArticleID=6212&l=en&t=long

Chemicals and other Hazardous Compounds

[265] Stockholm Convention Updated with Nine New Chemicals

Military Implications
Although the U.S. is not Party to the Stockholm Conventions, it should be prepared to comply with the requirements when acting in countries Party. Thus, it should consider the military implications of the additional substances phaseout and—if the case—find replacements.
Sources:
UN-backed conference promotes elimination of poisonous chemicals
http://www.un.org/apps/news/story.asp?NewsID=30686
Summary of the Fourth Conference of the Parties to the Stockholm Convention on Persistent Organic Pollutant
http://www.iisd.ca/vol15/enb15174e.html

[266] EU Legislation Banning Mercury Exports in Effect in 2011

Military Implications:
Relevant military personnel should assess which areas would be affected by the EU export ban and an eventual global regulation on the use of mercury. Replacements will be needed.
Sources:
Environment: Commission welcomes adoption of legislation to ban EU mercury exports
http://europa.eu/rapid/pressReleasesAction.do?reference=IP/08/1399&format=HTML&aged=0&language=EN&guiLanguage=en

[267] EU Updates the REACH System, and WEEE and RoHS Directives

Military Implications:
[Same as previous on this issue] EC efforts to enforce environmental regulations will trigger further changes in EU Member States' national legislation. Military stationed in the EU countries should review compliance with EU environmental regulations, as applicable.
Sources:
EU Member States approve world-wide rules for labelling of chemicals
http://europa.eu/rapid/pressReleasesAction.do?reference=IP/08/1844&format=HTML&aged=0&language=EN&guiLanguage=en
Environment: Commission proposes revised laws on recycling and use of hazardous substances in electrical and electronic equipment

http://europa.eu/rapid/pressReleasesAction.do?reference=IP/08/1878&format=HTML&aged=0&language=EN&guiLanguage=en

[268] Canada Increases Chemicals Control

Military Implications:
[Same as previous on similar issues] The military should review its use of these chemicals, if any, in anticipation of probable future regulatory actions by Canada and other jurisdictions.
Sources:
Ontario to enact toughest pesticide ban in Canada
http://www.thestar.com/News/Ontario/article/621989
Ontario Proposes Industry Detox Legislation
http://www.ens-newswire.com/ens/apr2009/2009-04-08-02.asp
Toxics Reduction Act, 2009
http://www.ebr.gov.on.ca/ERS-WEB-External/displaynoticecontent.do?noticeId=MTA2MTQ5&statusId=MTU5MTk4&language=en

[269] India to Enact Regulation Curbing Plastic Bags Use

Military Implications:
[Same as previous on this theme] 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:
Heavy baggage. India's urban environment
http://www.economist.com/world/asia/displaystory.cfm?story_id=13041382
In India, plastic bag use is a capital offence
http://www.theage.com.au/world/in-india-plastic-bag-use-is-a-capital-offence-20090117-7jl4.html

Forests Management

[271] Rights of Forest Peoples Need to Be Observed in Anti-deforestation Efforts

Military Implications:
The military should assist anti-deforestation efforts wherever possible, and should be careful to remain aware of the rights of the inhabitant populations in its own forest-related activities.
Sources:
Forest Peoples' Rights Key To Reducing Emissions From Deforestation
http://www.sciencedaily.com/releases/2008/10/081015110238.htm
Barcelona sets environment action agenda
http://www.iucn.org/news_events/events/congress/index.cfm?uNewsID=1946

[272] EU Batteries Directive Entered into Force

Military Implications:
Military stationed on EU territory should prepare to comply with the new Batteries Directive under the respective national Status of Forces Agreements.
Source:
New EU legislation requiring collection and recycling of spent batteries applies from today
http://europa.eu/rapid/pressReleasesAction.do?reference=IP/08/1411&format=HTML&aged=0&language=EN&guiLanguage=en

PROPOSED TREATIES AND/OR CHANGES TO EXISTING ONES

Water

[275] A New Step Toward Preventing Water Wars

Military Implications:
Since the draft articles are likely to lead to the text of a future international convention, relevant military personnel should follow these negotiations to see how they could be used to help support the Army Strategy for the Environment, reduce the likelihood of water-related conflicts, and identify potential impacts on its operations.
Sources:
International Law Commission Adopts Draft Articles of a Transboundary Aquifers Convention
http://www.asil.org/insights/2008/08/insights080827.html
International Law Commission sixtieth session; summary of the session
http://untreaty.un.org/ilc/sessions/60/60sess.htm#summary
World needs global water agreement now
http://www.panda.org/news_facts/newsroom/press_releases/index.cfm?uNewsID=143643
2008 World Water Week Press releases
http://www.worldwaterweek.org/press/index.asp
WWF in 'water wars' warning
http://www.inthenews.co.uk/news/wwf-in-water-wars-warning-$1236964.htm

[276] Draft Agreement for Management of International Aquifers

Military Implications:
In view of the strategic aspect of underground fresh water, relevant military personnel should consult the draft Convention and eventually provide inputs for improved relevance and enforcement. Also, the military should be prepared to consider its stipulations in their planning and operations, as well as in water-related conflict prevention.
Sources:
UNESCO publishes first world map of underground transboundary aquifers
http://portal.unesco.org/en/ev.php-URL_ID=43767&URL_DO=DO_TOPIC&URL_SECTION=201.html

Global groundwater maps
http://www.whymap.org/cln_092/whymap/EN/Downloads/downloads__node__en.html?__nnn=true

[277] "Roving" Marine Protected Areas as Climate Change Affects Migration

Military Implications:
The Navy and any other military involved in marine operations should notify relevant authorities of any observed migratory changes and, as a precautionary measure, monitor the course of any new regulations to ensure compliance.
Source:
Parks that can move when the animals do
http://features.csmonitor.com/environment/2009/03/04/parks-that-can-move-when-the-animals-do/

[278] U.S. and Canada to Control Air Emissions from Ships

Military Implications:
[Same as previous on similar issues] The military should be prepared to comply with new international anti-pollution regulations that may not exempt military craft. Transportation contract managers will need to prepare for these changes, with respect to bidder selection.
Sources:
US and Canada Request IMO Create Emissions Control Area Around Coastlines
http://www.greencarcongress.com/2009/03/us-and-canada-request-imo-create-emissions-control-area-around-coastlines.html
U.S., Canada Seek to Control Air Emissions from Ships
http://www.ens-newswire.com/ens/mar2009/2009-03-30-02.asp

[279] Measures Needed to Quiet Underwater Noise

Military Implications:
[Similar to previous on this issue] Notwithstanding the Court's decision, continuous research producing additional evidence of dangers, as well as increasing advocacy from conservation groups and the EU, might trigger negotiations for international controls on the use of sonar and other acoustic systems. In the meantime, monitoring of marine mammals' presence in areas of sonar use should be incorporated in Navy policy to allow for responsiveness in the event that further changes of policy were to occur. To reduce the sound of ships, noise reduction devices such as equal but opposite amplitude devices could be considered.
Sources:
Noisy, Acid Oceans Increasingly Harmful to Whales
http://www.ens-newswire.com/ens/dec2008/2008-12-03-03.asp
Man-made noise in world's seas threatens wildlife
http://www.reuters.com/article/environmentNews/idUSTRE4B26P920081203
Settlement Reached Between Navy And Environmental Groups Over Sonar Use
http://www.allheadlinenews.com/articles/7013545335

[280] Growing Marine Litter Increasingly Threatens Marine Ecosystems

Military Implications:
In addition to improving its own environmental performance, the military should consider offering assistance in regions where pollution control is inadequate.
Sources:
Marine Litter: A Global Challenge
http://www.unep.org/regionalseas/marinelitter/publications/docs/Marine_Litter_A_Global_Challenge.pdf
Report Brings to the Surface the Growing Global Problem of Marine Litter
http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=589&ArticleID=6214&l=en&t=long

Chemical and Biological Safety

[282] Chemical and Biosecurity Issues

Military Implications:
The military and its relevant contractors should consider collaborating in the establishment of international safety standards and procedures, as well as anticipating potential regulations in the planning of future R&D in these areas. Meanwhile, research on detection and countermeasures should increase.
Sources:
Al-Qaeda Reportedly Suffers WMD Mishap
http://gsn.nti.org/gsn/nw_20090121_4538.php
Experts Debate Threat of Nuclear, Biological Terrorism
http://gsn.nti.org/gsn/nw_20090113_7105.php
Al-Qaeda cell killed by Black Death 'was developing biological weapons'
http://www.telegraph.co.uk/news/worldnews/africaandindianocean/algeria/4294664/Al-Qaeda-cell-killed-by-Black-Death-was-developing-biological-weapons.html
Bioterrorists Could Employ Insects, Expert Warns
http://gsn.nti.org/gsn/nw_20090106_5074.php
Book Review: Six-Legged Soldiers: Using Insects as Weapons of War
http://www.sciencenews.org/view/generic/id/39506/title/Book_Review_Six-Legged_Soldiers_Using_Insects_as_Weapons_of_War_by_Jeffrey_A._Lockwood_
Drug Safety Watchdog Sees Al-Qaeda Risk to U.S. Food, Drug Imports
http://gsn.nti.org/gsn/nw_20090129_3617.php

[283] Dangers Increase from "Amateur" Genetic Engineering; the Biological Weapons Convention to be Updated

Military Implications:

Since the risks of irregular use of synthetic biology are increasing, new international regulations seem inevitable. The military and its relevant contractors should consider collaborating in the establishment of international safety standards, and anticipate potential regulations in the planning of future R&D in these areas. Meantime, it should also investigate measures for detecting occurrences of such experimentations, and protection against negative consequences.
Sources:
Amateurs are trying genetic engineering at home
http://news.yahoo.com/s/ap/20081225/ap_on_sc/do_it_yourself_dna
Man-made SARS virus spreads fear
http://www.canberratimes.com.au/news/local/news/general/manmade-sars-virus-spreads-fear/1394539.aspx?storypage=1
Analysts Debate Bioterror Risks
http://gsn.nti.org/gsn/nw_20081211_8851.php
Informal Advance Report of the Meeting of States Parties
http://www.unog.ch/80256EDD006B8954/%28httpAssets%29/C70514F42F7BF072C1257516005B1E7A/$file/BWC+MSP+2008+Advance+Report.pdf
The 2008 Meeting of States Parties (BioWeapons Prevention Project daily reports)
http://www.cbw-events.org.uk/MSP08-combined.pdf
Russia Backs Legally Binding Oversight System for Biological Weapons Convention
http://www.globalsecuritynewswire.org/gsn/nw_20081209_7554.php

[284] Research Labs Safety Questioned

Military Implications:
In addition to regular review of safety measures at military biological facilities, expert military personnel should explore how they might help their civilian counterparts to improve security of their biological research facilities.
Source:
Swine Flu May Be Human Error; WHO Investigates Claim (Update1)
http://www.bloomberg.com/apps/news?pid=20601087&sid=afrdATVXPEAk&refer=worldwide
Canadian accused of smuggling Ebola
http://cnews.canoe.ca/CNEWS/Crime/2009/05/14/9453961-sun.html

[285] New Chemicals Considered for Toxic Lists

Military Implications
Although the U.S. is not Party to either the Stockholm or Rotterdam Conventions, it should be prepared to comply with their requirements when acting in countries Party. Thus, in addition to the preparation for phase-out of the already listed compounds, it should consider the military implications of the additional substances suggested for review and anticipate their replacement.
Sources:
New List of Hazardous Substances Spotlighted for International Action
http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=548&ArticleID=5947&l=en

Summary of the Fourth Meeting of the Persistent Organic Pollutants Review Committee of the Stockholm Convention (13-17 October 2008)
http://www.iisd.ca/vol15/enb15161e.html
Three Chemicals Considered for Trade 'watch list'
http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=548&ArticleID=5953&l=en
Rotterdam Convention COP4 Documents of the Conference of the Parties
http://www.pic.int/home.php?type=b&id=138&sid=27&tid=41
Rotterdam PIC COP 4 Highlights (Tuesday, 28 October 2008)
http://www.iisd.ca/vol15/enb15165e.html

[286] New Chemicals Considered for Toxic Lists

Military Implications:
In anticipation of potential future restrictions, as well as for obvious health reasons, if not already done so, the military should maintain a comprehensive database with all compounds and substances believed to present health and/or environmental hazards and considered for regulations, regions/countries where those apply, and possible implications for the military.
Sources:
Backgrounder on Batch 4 of the Chemicals Management Plan
http://www.chemicalsubstanceschimiques.gc.ca/challenge-defi/batch-lot-4/background-information_e.html
Formaldehyde Emissions from Pressed Wood Products
http://www.epa.gov/opptintr/chemtest/formaldehyde/index.htm
Ailing Boca Raton firefighters blame chemical in pants
http://www.palmbeachpost.com/localnews/content/local_news/epaper/2009/01/10/a1a_boca_pants_0111.html
Toxic pesticides banned in Europe
http://euobserver.com/9/27399/?rk=1

[287] New Substances Identified as Harmful to Human Health and the Environment

Military Implications:
The military should review the use of products containing newly listed toxic compounds, as well as be alert to the possible dangers from “inert” components, and consider safer alternatives. In cases such as Kenya, it should assess potential security implications of eventual illegal trafficking of banned chemicals.
Sources:
30 'New' Toxic Chemicals to Avoid
http://www.thedailygreen.com/environmental-news/latest/toxic-chemicals-47061601
Kenya Considers a Ban on Pesticide Used to Kill Lions and Wildlife
http://e360.yale.edu/content/digest.msp?id=1910
P Glyphosate Formulations Induce Apoptosis and Necrosis in Human Umbilical, Embryonic, and Placental Cells

http://pubs.acs.org/doi/abs/10.1021/tx800218n
Weed killer kills human cells. Study intensifies debate over 'inert' ingredients
http://www.environmentalhealthnews.org/ehs/news/roundup-weed-killer-is-toxic-to-human-cells.-study-intensifies-debate-over-inert-ingredients

[288] Canada Extends Toxic Substances Lists

Military Implications:
The military should review its use of these chemicals, if any, in anticipation of probable future regulatory actions by Canada and other jurisdictions.
Source:
4 chemicals used in consumer products slapped with toxic label
http://www.canada.com/news/chemicals%20consumer%20products%20slapped%20with%20toxic%20label/1362478/story.html

[289] Concerns Increasing for BPA Bans and Phthalates

Military Implications:
The military should institute or continue preparations for possible further restrictions on the use of these compounds.
Sources:
U.S. National Toxicology Program. Bisphenol A Evaluation
http://cerhr.niehs.nih.gov/chemicals/bisphenol/bisphenol-eval.html
3rd Largest U.S. Supermarket Chain to Ban Baby Bottles with Bisphenol-A
http://www.thedailygreen.com/environmental-news/latest/bisphenol-a-47102204?src=rss
Plastics industry behind FDA research on bisphenol A, study finds
http://www2.jsonline.com/story/index.aspx?id=809282
Male, interrupted
http://www.philly.com/inquirer/magazine/20081027_Male__interrupted.html

GREENHOUSE GAS EMISSIONS

Post-Kyoto Protocol Nogotiations

Military Implications:
[Same to all on this issue] 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:

[292] **June 2009**
Heating up or cooling down?
http://www.economist.com/world/asia/displaystory.cfm?story_id=13832227
Climate pact: What kind of deal can emerge in Copenhagen?
http://www.terradaily.com/2007/090614011736.b0erysqv.html
700,000 addresses face being washed off map
http://www.smh.com.au/environment/global-warming/700000-addresses-face-being-washed-off-map-20090612-c64c.html
Nations may form global CO2 market without U.N. deal
http://www.reuters.com/article/GCA-GreenBusiness/idUSTRE55B67V20090612
The great carbon credit con: Why are we paying the Third World to poison its environment?
http://www.dailymail.co.uk/home/moslive/article-1188937/The-great-carbon-credit-eco-companies-causing-pollution.html
Friends of the Earth slams "fundamentally flawed" offsetting model
http://www.businessgreen.com/business-green/news/2243304/friends-earth-slams
INTERVIEW-Global warming is a security threat - Kofi Annan
http://www.reuters.com/article/featuredCrisis/idUSLN472597
'Climate change is already here'
http://www.saipantribune.com/newsstory.aspx?newsID=91436&cat=1
African Ministers Adopt the Nairobi Declaration on Climate
http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=589&ArticleID=6199&l=en&t=long
American Clean Energy and Security Act of 2009
http://thehill.com/images/stories/news/2009/june/getdoc.cgi.pdf
House Passes Bill to Address Threat of Climate Change
http://www.nytimes.com/2009/06/27/us/politics/27climate.html?_r=1&th&emc=th

[293] **May 2009**
Ad Hoc Working Group on Long-Term Cooperative Action under the Convention
http://unfccc.int/resource/docs/2009/awglca6/eng/08.pdf
Another step towards new climate change pact taken with online UN publication
http://www.un.org/apps/news/story.asp?NewsID=30854
"It's the first time [a] real negotiating text will be on the table which can serve as a basis for governments to start drafting a Copenhagen agreed outcome."
http://unfccc.int/resource/docs/2009/awglca6/eng/08.pdf

[294] **April 2009**
Latest round of UN talks on pact to combat global warming wraps up in Bonn
http://www.un.org/apps/news/story.asp?NewsID=30433&Cr=climate&Cr1=change
Small Islands Urge Deep CO2 Cuts, Fear Rising Seas
http://planetark.org/wen/52316

China, India reject climate agreement that obstructs economic growth
http://mangalorean.com/news.php?newstype=local&newsid=119511
China considers setting targets for carbon emissions
http://www.guardian.co.uk/world/2009/apr/19/china-environment-kyoto

[295] **March 2009**
"Climate Change: Global Risks, Challenges and Decisions", 10-12 March 2009, Copenhagen
http://climatecongress.ku.dk/
Climate scenarios 'being realised'
http://news.bbc.co.uk/2/hi/science/nature/7940532.stm
Did climate conference just confuse the politicians?
http://www.newscientist.com/article/mg20127004.200-did-climate-conference-just-confuse-the-politicians.html
Tough climate signal to West
http://www.telegraphindia.com/1090301/jsp/nation/story_10608007.jsp

[296] **January 2009**
Climate change: Commission sets out proposals for global pact on climate change at Copenhagen
http://europa.eu/rapid/pressReleasesAction.do?reference=IP/09/141&format=HTML&aged=0&language=EN&guiLanguage=en
EU unveils proposals for global climate change deal
http://euobserver.com/9/27490/?rk=1
EU urges US climate commitment
http://news.bbc.co.uk/2/hi/science/nature/7856120.stm
BP's Hayward Says World Needs A Carbon Price
http://planetark.org/wen/51403
Ministerial Conference on Transport Calls on IMO and ICAO to Pursue Work on Reducing GHG Emissions http://www.mlit.go.jp/kokusai/MEET/index_en.html
Statement: http://www.mlit.go.jp/kokusai/MEET/documents/Ministerial_Declaration.pdf
Transport can help propel world to greener future
http://www.reuters.com/article/environmentNews/idUSTRE50E3CW20090115
World Economic Forum Annual Meeting 2009 "Shaping the Post-Crisis World", Davos-Klosters, Switzerland, 28 January - 1 February, 2009
http://www.weforum.org/en/events/AnnualMeeting2009/index.htm

[297] **December 2008**
U.N. Chief Tells World: We Need A Green New Deal
http://planetark.org/wen/50878

Slow Progress in Poznan While Climate Threats Mount
http://www.ens-newswire.com/ens/dec2008/2008-12-13-01.asp
UN climate talks stalling thanks to EU weakness
http://www.wwf.org.uk/what_we_do/press_centre/index.cfm?uNewsID=2552
Fiddling with words as the world melts
http://www.economist.com/world/international/displaystory.cfm?story_id=12815686
Dispute on carbon tax mars climate talks
http://www.iht.com/articles/ap/2008/12/13/europe/EU-Poland-Climate-Talks.php
CLIMATE CHANGE: Poznan Produces a 'Vision Gap'
http://www.ipsnews.net/news.asp?idnews=45103
Dispute on carbon tax mars climate talks
http://www.iht.com/articles/ap/2008/12/13/europe/EU-Poland-Climate-Talks.php
UN Climate Chief Says Comprehensive Treaty May Not Come by 2009
http://www.bloomberg.com/apps/news?pid=20601082&sid=a4T0Jeo1WFXY&refer=canada
Climate change: A battle for the planet
http://www.independent.co.uk/environment/climate-change/climate-change-a-battle-for-the-planet-1059458.html
U.N. climate adaptation fund running out of cash
http://www.alertnet.org/thenews/newsdesk/L6349998.htm
U.N. chief may call climate summit in September 2009
http://planetark.org/wen/50884
German Scientist Warns Climate Change Accelerating
http://www.dw-world.de/dw/article/0,,3907790,00.html
Time to prepare for disasters caused by climate change is now, says UN
http://www.un.org/apps/news/story.asp?NewsID=29154&Cr=Disaster&Cr1=Climate

[298] November 2008

Australia cries foul over climate rules on developing countries
http://www.theaustralian.news.com.au/story/0,25197,24708236-30417,00.html
Africans to stick together in climate change talks
http://www.montereyherald.com/search/ci_11032312
Press briefing on Key Greenhouse Gas Data and expected outcomes of Poznań:
http://unfccc.int/press/items/2794.php
UN says greenhouse gas emissions rose 2.3 percent in 40 industrialized nations in 2000-06
http://www.startribune.com/business/34600224.html?elr=KArks:DCiU1OiP:DiiUiD3aPc:_Yyc:aUU
From Bad to Worse: Latest Figures on Global Greenhouse Gas Emissions
http://www.sciam.com/article.cfm?id=from-bad-to-worse-with-greenhouse-gas-emissions
The Poznan conference opens on December 1. Agenda and scheduled events are available at:
http://regserver.unfccc.int/seors/reports/events_list.html

[299] October 2008

Japan drafts replacement for Kyoto Protocol
http://mdn.mainichi.jp/mdnnews/news/20080927p2a00m0na001000c.html (alternate link http://www.zibb.com/article/4055041/Japan+drafts+replacement+for+Kyoto+protocol)

[300] **September 2008**

Australia told to cut greenhouse gas emissions
http://thestar.com.my/news/story.asp?file=/2008/9/5/apworld/20080905181547&sec=apworld
Ross Garnaut's nuclear knockout
http://www.news.com.au/heraldsun/story/0,21985,24301012-664,00.html
Garnaut Climate Change Review
http://www.garnautreview.org.au/

[301] **July-August 2008:**

Accra Climate Change Talks, 21-27 August 2008, Accra, Ghana
http://www.iisd.ca/climate/ccwg2/
UN Climate Talks Split Over Deforestation Funds
http://www.planetark.com/dailynewsstory.cfm/newsid/49919/story.htm
UN climate talks to seek speed amid discord
http://www.planet2025news.net/ntext.rxml?id=20330&photo=
New CO2 emissions treaty is imminent
http://www.independent.co.uk/environment/climate-change/new-co2-emissions-treaty-is-imminent-907305.html
Rich Urged to Set Deep Climate Cuts, Without US
http://www.planetark.org/dailynewsstory.cfm/newsid/49846/story.htm
U.N. climate talks seek quicker pace
http://uk.reuters.com/article/environmentNews/idUKLJ46600720080820?sp=true
Rich or Poor? New Faultline in UN Climate Talks
http://www.planetark.org/dailynewsstory.cfm/newsid/50006/story.htm
Japan to launch carbon footprint labelling scheme
http://www.guardian.co.uk/environment/2008/aug/20/carbonfootprints.carbonemissions

[302] **Regulations Might be Needed for New Greenhouse Gases**

Military Implications:
The military and its contractors should consider substitutes and also promote the phaseout of the compounds in question. Also, based on previous experience and in view of increased attention to environment and climate change, it is likely that new standards and more thorough research and scrutiny of new chemicals will be mandatory before introducing them into use.
Sources:
New Greenhouse Gas Identified
http://www.terradaily.com/reports/New_Greenhouse_Gas_Identified_999.html
New greenhouse gas identified. Early detection may permit 'nipping it in the bud'
http://web.mit.edu/newsoffice/2009/prinn-greenhouse-tt0311.html
US wants to move on climate change

http://www.bostonherald.com/news/us_politics/view/2009_04_29_US_wants_to_move_on_climate_change
New greenhouse gases targeted by UN talks
http://www.spacedaily.com/reports/New_greenhouse_gases_targeted_by_UN_talks_999.html

[303] Aviation and Shipping should be Subject to Emissions Cuts

Military Implications:
[Same to previous on similar issue] It is likely that scientific assessments and increasing pressure from environmental groups, and even political parties, will trigger regulations on pollution generated by the shipping industry. The military should seek to use the most environment-friendly technologies in order to reduce its pollution and be prepared for eventual new regulations, wherever applicable.
Sources:
Aviation and shipping cannot trade away emissions, scientist warns
http://www.guardian.co.uk/environment/2008/sep/24/carbonemissions.emissionstrading
EU Lawmaker Demands Shipping Included in CO2 Caps
http://www.planetark.com/dailynewsstory.cfm/newsid/50188/story.htm
EU Lawmaker Warns CO2 Caps in Danger, Eyes Shipping
http://www.planetark.com/dailynewsstory.cfm/newsid/50185/story.htm
Ports gear up for Clean Trucks Program
http://www.dailybreeze.com/ci_10580651

[304] Aviation to be included in the EU Emissions Trading System from 2012

Military Implications:
Although military flights are exempted for now, the military should explore impacts on its European operations and contractors and be prepared to increase efforts for reducing emissions as much as possible.
Sources:
Aviation to be included in the European Trading System from 2012 as MEPs adopt legislation
http://www.europarl.europa.eu/news/expert/infopress_page/064-33577-189-07-28-911-20080707IPR33572-07-07-2008-2008-false/default_en.htm
Aviation industry attacks EU emissions plan that effects airlines worldwide
http://euobserver.com/9/26511

[305] Airline Group Supports Including Aviation in Global Emissions Trading Scheme

Military Implications:
[Similar to previous on this issue] It is not clear at this point if the proposals for including the aviation industry in the global emissions-trading scheme concern only commercial and private flights, or all. The military should explore possible impacts on its operations and consult with allied military forces on the status of military exemptions.
Source:
Airline group backs global emissions trading scheme
http://uk.reuters.com/article/governmentFilingsNews/idUKSP41096120090406

[306] New Zealand Adopts Carbon Trading Scheme in 2009

Military Implications:
[Similar to previous on related issue] Australia and New Zealand are the only countries outside the EU to adopt a carbon-trading regime. However, it is likely that the trend will continue under increasing pressure from environmental groups, and even political parties. The military should seek to use the most environment-friendly technologies in order to reduce its pollution and be prepared for eventual new regulations, wherever applicable.
Sources:
Climate Change (Emissions Trading and Renewable Preference) Bill
http://www.parliament.nz/en-NZ/PB/Legislation/Bills/c/0/4/00DBHOH_BILL8368_1-Climate-Change-Emissions-Trading-and-Renewable.htm
New Zealand Parliament Passes Carbon Trading Scheme
http://www.planetark.com/dailynewsstory.cfm/newsid/50193/story.htm

[307] China Adopting Pollution Tax Systems

Military Implications:
[Similar to previous on related issue] It is likely that the trend of adopting pollution-reduction systems will expand under increasing pressure from environmental groups, and even political parties. The military should seek to use the most environment-friendly technologies in order to reduce its pollution and be prepared for eventual new regulations, wherever applicable.
Source:
China Mulls Green Tax to Curb Pollution – Report
http://www.planetark.com/dailynewsstory.cfm/newsid/50226/story.htm

[308] New Jersey Ports Pushing for Toxic Diesels Ban

Military Implications:
Military logistics planners should continue their preparations for the worldwide spread of restrictions of this kind. Additional domestic bans are becoming more likely as a result of the federal policy proposal to allow increased state-level imposition of anti-pollution measures.
Source:
N.J. pushing for restrictions on diesel trucks at ports
http://www.northjersey.com/environment/NJ_pushing_for_restrictions_on_diesel_trucks_at_ports.html

New Technologies

[310] Increasing Militarization of Space Might Require Outer Space Treaty Review

Military Implications:

[Same as previous on similar issues] Further developing an integrated environmental monitoring capability to provide informed data to the public and policy- and decision-makers would considerably improve the assessment of potential environmental impacts of different actions, facilitate enforcement of international treaties worldwide, and could help mitigate environmental and social consequences induced by conflicts or natural disasters. The military should consider full cooperation in all the phases—from development to implementation and use of international space-based observation systems.
Sources:
Ministerial Council 2008
http://www.esa.int/SPECIALS/Ministerial_Council/index.html
From Venus to Mars. The European Union's steps towards the militarisation of space
http://www.tni.org/detail_pub.phtml?&know_id=276&menu=11e
Space, Security and the Economy
http://www.epsusa.org/publications/papers/spacesecurity.pdf

[311] Steps for an International Regime for Space Debris and Space Traffic Control System

Military implications:
In addition to the DOD's Commercial and Foreign Entities program, the military should increase cooperation with military counterparts and civilian organizations around the world to explore joint research programs and design of a legal framework to increase space security.
Sources:
Key findings from the 5th European Conference on Space Debris
http://www.esa.int/SPECIALS/Space_Debris/SEMYN9LTYRF_0.html
An Urgent Call To Action On Space Debris
http://www.spacedaily.com/reports/An_Urgent_Call_To_Action_On_Space_Debris_999.html
Making The Space Environment Safer For Civil And Commercial Users
http://www.spacedaily.com/reports/Making_The_Space_Environment_Safer_For_Civil_And_Commercial_Users_999.html
Asteroid 2009 DD45 Misses Earth
http://www.associatedcontent.com/article/1527316/asteroid_2009_dd45_misses_earth.html

[312] International Satellite Collision Triggers Regulations Review

Military implications:
This accident and property loss offers an opportunity to explore joint research programs to reduce current space debris, increase R&D to collect debris, and improve modeling software to monitor and predict in greater detail NEO trajectories, as well as seek military-to-military cooperation to explore joint research programs to reduce debris and the likelihood of accidents.
Sources:
UN Reiterates the Importance of the Implementation of the Space Debris Guidelines to Curtail Space Debris in Future
http://www.unis.unvienna.org/unis/pressrels/2009/unisos376.html
Outer Space Scientific and Technical Subcommittee Concludes its 46th Session in Vienna

http://www.unis.unvienna.org/unis/pressrels/2009/unisos377.html
Following Collision of Satellites, UN Space Office Calls For Preventive Steps
http://www.un.org/apps/news/story.asp?NewsID=29908&Cr=outer+space&Cr1=
When Satellites Collide
http://www.spacemart.com/reports/It_Finally_Happened_Two_Satellites_Collide_999.html
Sat collision highlights growing threat
http://news.bbc.co.uk/2/hi/science/nature/7885750.stm?lss

[313] Rocket Launches Might Need Regulation to Safeguard Ozone Layer

Military Implications:
The military and its contractors should prepare to comply with eventual new rocket launch regulations and intensify R&D for replacing ozone-depleting CFCs. [Refer also to item Regulations Might be Needed for New Greenhouse Gases above.]
Source:
Scientists: Regulate Rocket Launches to Safeguard Ozone Layer
http://www.ens-newswire.com/ens/apr2009/2009-04-01-091.asp

[314] Advancements on Non-proliferation and Nuclear Disarmament

Military Implications:
Since the new US Administration has voiced interest in non-proliferation, the military should assess all the opportunities to facilitate the NPT negotiations and international cooperation to improve nuclear safety, as well as recommend policy, training, and institutional or physical changes to implement the recommendations.
Sources:
Agenda set for UN-backed 2010 review of Nuclear Non-Proliferation Treaty
http://www.un.org/apps/news/story.asp?NewsID=30816&Cr=npt&Cr1
Ambassador Boniface G. Chidyausiku of Zimbabwe, the chairman of the preparatory committee's third session (video)
http://webcast.un.org/ramgen/ondemand/pressconference/2009/pc090515pm1.rm)
Third Preparatory Committee For 2010 Nuclear Non-Proliferation Treaty Review Conference Concludes Successfully With Adoption Of Consensus Report
http://www.un.org/News/Press/docs//2009/dc3174.doc.htm
Preparatory Committee for the 2010 Nuclear Non-Proliferation Treaty Review Conference 4 – 15 May 2009 in New York, Third Session
http://www.un.org/disarmament/WMD/Nuclear/NPT2010Prepcom/PrepCom2009/index.html
World cannot afford to put disarmament on backburner, Ban tells States
http://www.un.org/apps/news/story.asp?NewsID=30679&Cr=disarmament&Cr1=proliferation
Agenda Set for NPT Review Conference
http://gsn.nti.org/gsn/nw_20090508_6808.php
Delegates Take Key Step in Nuclear Treaty Review
http://www.examiner.com/a-2004371~Delegates_take_key_step_in_nuclear_treaty_review.html

Obama to Support Compromise at U.N. Disarmament Talks
http://gsn.nti.org/gsn/nw_20090527_4184.php
Nations Agree to Work Plan for Conference on Disarmament
http://gsn.nti.org/gsn/nw_20090529_1083.php
IAEA Governors to Consider Nuclear Fuel Bank Proposals
http://gsn.nti.org/gsn/nw_20090520_6166.php
Big names and bucks back nuclear 'bank'
http://www.washingtonpost.com/wp-dyn/content/article/2009/05/19/AR2009051902267.html

Waste Management

[316] European Union to Consider Regulations for Curbing Biowaste

Military Implications:
The military stationed in the EU region should increase its biowaste management practices and be prepared to comply with eventual new regulations.
Sources:
Council Conclusions. Green Paper on the management of bio-waste in the European Union
http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/envir/108751.pdf
EU biowaste directive moves a step closer
http://www.euractiv.com/en/sustainability/eu-biowaste-directive-moves-step-closer/article-183575

Weapons-related

[318] Increased Efforts Needed to Counter the Proliferation of Weapons of Mass Destruction

Military Implications:
The status of current and potential weapons of mass destruction and weaponizable materials should constantly be reviewed in light of possible violations of the applicable international regulations and eventual updates of those regulations. Those with responsibilities in this area should consider assessing national and international opportunities for assisting in compliance and efficiency of the regulations, as well as strategies adapted to new geopolitical realities.
Sources:
Progress Has Been Made, but More Needs To Be Done To Implement Resolution 1540 in Full, United Nations Security Council 1540 Committee Concludes
http://www.un.org/News/Press/docs/2008/sc9425.doc.htm
Asian neighbours 'could go nuclear'
http://www.news.com.au/story/0,23599,24213168-5007133,00.html
G-8 Global Partnership: Adapting to New Realities
http://www.partnershipforglobalsecurity.org/documents/Press_Release_G8GP_Final.pdf
U.N. non-proliferation center in Nepal
http://www.metimes.com/Security/2008/08/18/un_non-proliferation_center_in_nepal/2741/

[319] Support for Total Ban on Nuclear Weapons Increases

Military Implications:
The military should explore cooperation with these initiatives as an alternative way of facilitating the NPT negotiations to improve global nuclear safety.
Sources:
Members of the European Parliament launch support for a total ban on nuclear weapons: Marking the 40th anniversary of the nuclear Non-Proliferation Treaty
http://www.gsinstitute.org/pnnd/archives/07_01_08_PR_EP.html
International Commission on Nuclear Non-Proliferation and Disarmament
http://www.pm.gov.au/media/Release/2008/media_release_0352.cfm

[320] Advancements in Setting the Agenda for the 2010 NPT Review

Military Implication:
The military should assess all the opportunities to facilitate the NPT negotiations and support the IAEA and international cooperation to improve global nuclear safety, as well as recommend policy, training, and institutional or physical changes needed to implement the recommendations.
Source:
Joint Press Conference between Mr Gareth Evans and Ms Yoriko Kawaguchi, Co-Chairs, International Commission for Nuclear Non-proliferation and Disarmament
http://www.icnnd.org/media/joint_conf_211008.html

[321] Biological Weapons Convention Meeting, August 2008

Military Implications:
Without better international controls, terrorist access to biological weapons seems inevitable. Great progress has been made on bioweapons sensors over the past several years, some of which have been referenced in these monthly reports for AEPI. Relevant military personnel should consider making recommendations at the upcoming meetings.
Sources:
Biological Weapons Convention Experts to Meet In Geneva from 18 To 22 August
http://www.unog.ch/80256EDD006B9C2E/(httpNewsByYear_en)/623C880718912F67C12574A50040EA3F?OpenDocument
The Inter Review Conference Meetings. 2008 Meeting of Experts: 18-22 August 2008
http://www.opbw.org/new_process/mx2008/mx2008.htm
UN hosts summit on dangers of biological weapons
http://www.mg.co.za/article/2008-08-18-un-hosts-summit-on-dangers-of-biological-weapons

IMPROVED ENFORCEMENT OF ENVIRONMENTAL REGULATIONS

[323] Likelihood of Climate Lawsuits Increasing

Military Implications:

The trend of improving environmental regulations and applying the "polluter pays" principle is increasing, with no exception for any industry. To avoid eventual litigation, the military should consider documenting its efforts to reduce greenhouse gas emissions and enhancing its efforts to include environmental factors in planning and operations.
Sources:
Science paves way for climate lawsuits
http://www.guardian.co.uk/environment/2008/dec/09/oil-business-climate-change-flooding
Beyond Adaptation
http://www.wwf.org.uk/research_centre/index.cfm?uNewsID=2505
New U.N. pact may be needed for climate victims: WWF
http://www.alertnet.org/thenews/newsdesk/L3148346.htm

[324] UK Could Seize Planes to Enforce European Emissions Trading Scheme

Military Implications:
It seems that, at this point, the regulation and UK Environmental Agency power apply only to commercial and private flights. Nevertheless, the military should explore potential impacts on its European operations and consult with allied military forces on the status of military exemptions.
Source:
Airlines that break emission rules could have planes seized
http://www.guardian.co.uk/business/2009/mar/04/carbon-emissions-airlines-climate-change

[325] New UN-linked Body Proposed to Protect Biodiversity and Ecosystem Services

Military Implications:
Defense of the biosphere is the responsibility of many organizations, and increasingly the military will be called upon to help. As a result, it would be wise for military planners to take biodiversity and ecosystem services into consideration in its future scenarios and planning. Once the new intergovernmental body is created, existing biodiversity-related regulations are more likely to be better enforced and new regulations are likely to be created. The new body should also improve global strategic analysis to better address biodiversity loss. The military should also consider its future roles with this organization, and how tougher biodiversity and ecosystem protection standards could affect its training and operations planning.
Sources:
Ad hoc Intergovernmental and Multi-Stakeholder Meeting on an Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
http://ipbes.net/en/index.aspx
Summary of the Ad Hoc Intergovernmental and Multi-Stakeholder Meeting on an Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
http://www.iisd.ca/ymb/ipbes/html/ymbvol158num1e.html
How Best to Put 'Nature-Based Assets' at the Top of the International Political Agenda Focus of Malaysia Meeting
http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=550&ArticleID=5972&l=en

[326] Intergovernmental Forum on Chemical Safety becomes part of the International Conference on Chemicals Management

Military Implications:

Since the Intergovernmental Forum on Chemical Safety moved under the ICCM, its decisions are more likely to become legally binding international agreements. The military should seek cooperation with the Forum to assess effectiveness of existing chemical safety-related regulations and eventually suggest new enforcement and/or safety issues, as well as remain informed of discussions that might generate future regulations impacting military activities.

Sources:

Intergovernmental Forum on Chemical Safety VI: Global Partnership in Chemical Safety Contributing to the 2020 Goal
http://www.iisd.ca/chemical/ifcs6/
Intergovernmental Forum on Chemical Safety—Forum VI
http://www.who.int/ifcs/forums/six/en/index.html

[327] Progress in the Elimination of Chemical Weapons Stockpiles

Military Implications:

[Similar to previous on this issue] The efforts to speed up chemical weapons destruction should be increased. The state of current and potential weaponizable chemicals and of chemical plants should continue to be reviewed in light of possible violations of the CWC or of eventual amendments to the CWC. Those with responsibilities in this area should consider new ways to speed international compliance and improve efficiency of the CWC regulations.

Sources:

Thirteenth Session of the Conference of the States Parties
http://www.opcw.org/documents-reports/conference-of-the-states-parties/thirteenth-session/
Ban calls for continued efforts to eliminate scourge of chemical weapons
http://www.un.org/apps/news/story.asp?NewsID=29166&Cr=disarmament&Cr1=chemical+weapon
U.N. Chief Promotes Chemical Disarmament
http://www.globalsecuritynewswire.org/gsn/nw_20081203_7682.php

[328] Ozone Continues to Thin over Antarctica Casting Doubt on Success of the Montreal Protocol

Military Implications:

The military and its contractors should increase efforts to reduce ozone-depleting substances and should prepare to comply with eventual new phase-outs.

Sources:

The world we avoided
http://www.nature.com/news/2008/080905/full/news.2008.1081.html
Ozone hole 8% larger this year, meteorologists say
http://www.chron.com/disp/story.mpl/headline/nation/6004433.html

The ozone hole of 2008 is larger than in 2007
http://www.wmo.int/pages/mediacentre/press_releases/pr_829_en.html

[329] New Air Quality Evaluation Tool

Military Implications:
The military should investigate the use of this tool for modeling and managing chemical and biological warfare incidents and in studies of the environmental impact of new projects.
Sources:
New Tool For Study Of Air Quality Developed
http://www.sciencedaily.com/releases/2009/03/090311085406.htm
The evaluation of the air quality impact of an incinerator by using MM5-CMAQ-EMIMO modeling system: North of Spain case study (abstract)
http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6V7X-4SBYYGS-1&_user=10&_rdoc=1&_fmt=&_orig=search&_sort=d&view=c&_acct=C000050221&_version=1&_urlVersion=0&_userid=10&md5=7cd8a3dfb80125e265f078e654526891

[330] East African Projects to Fight Environmental Crime and Link Journalists

Military Implications:
AFRICOM and other relevant military components should seek cooperation with the ECP and to both help and use the NECJOGHA, offering support for increasing environmental protection in that highly vulnerable area in order to prevent and/or resolve conflicts related to environmental factors.
Sources:
Stakeholders Meeting and Launch of ISS-EAPCCO Environmental Crime Project
http://www.issafrica.org/index.php?link_id=6299&link_type=12&tmpl_id=3
Launch of the Environmental Crime Project in Eastern Africa
http://www.necjogha.org/node/86
NECJOGHA
http://www.necjogha.org

[331] Indonesian Navy to Tighten Security in Sea Border Areas

Military Implications:
The Navy and other military stationed in the area (e.g. the COMLOG WESTPAC) should explore options to support the Indonesian Navy with these law enforcement efforts.
Sources:
Indonesian Navy To Tighten Security In Border Areas
http://www.bernama.com/bernama/v5/newsgeneral.php?id=359652
CENTRIXS Online for CARAT and Naval Engagement Activity
http://www.navy.mil/search/display.asp?story_id=39075
COMLOG WESTPAC
http://www.clwp.navy.mil/

[332] **Vietnam Cracking Down on Environmental Violators**
Military Implications:
This could be an opportunity to explore military-to-military environmental security cooperation.
Source:
Vietnam Cracks Down on Polluters
http://www.time.com/time/world/article/0,8599,1851331,00.html

SAFETY ISSUES

Nuclear Safety

[335] **IAEA Director Warns on Continuous Nuclear Safety Issues**
Military Implication:
The military should assess all the opportunities to facilitate the NPT negotiations and support the IAEA and international cooperation to improve global nuclear safety, as well as recommend policy, training, and institutional or physical changes needed to implement the recommendations.
Sources:
Joint Press Conference between Mr Gareth Evans and Ms Yoriko Kawaguchi, Co-Chairs, International Commission for Nuclear Non-proliferation and Disarmament
http://www.icnnd.org/media/joint_conf_211008.html
Statements of the Director General
http://www.iaea.org/NewsCenter/Statements/2008/ebsp2008n010.html
Rate of Nuclear Thefts 'Disturbingly High,' Monitoring Chief Says
http://www.nytimes.com/2008/10/28/world/28nuke.html?_r=1&ref=world_&oref=slogin
IAEA Updates Nuclear Trafficking Database; Few Trends Seen in Information on Illicit Incidents
http://www.nti.org/d_newswire/issues/2008_9_29.html#802352F5

[336] **New Recommendations for Reducing Nuclear Risk**
Military Implications:
These reports should be reviewed as part of the continuous efforts for reducing the risks linked to nuclear safety. The recommendations could be included in plans for assisting in compliance and improving effectiveness of current and future regulations.
Sources:
Lifting the Nuclear Shadow: Creating the Conditions for Abolishing Nuclear Weapons
http://www.fco.gov.uk/resources/en/pdf/pdf1/nuclear-paper
British Policy Paper Calls for Eliminating Global Nuclear Weapons
http://gsn.nti.org/gsn/nw_20090204_1382.php
Future of the Nuclear Security Environment in 2015: Proceedings
http://www.nap.edu/catalog.php?record_id=12590
Internationalization of the Nuclear Fuel Cycle: Goals, Strategies, and Challenges

http://www.nap.edu/catalog.php?record_id=12477

[337] Nuclear Security Addressable only Internationally

Military Implications:
Ongoing reviews of the status of current and potential weapons of mass destruction and weaponizable materials should include continued efforts to increase international opportunities for assisting in compliance and effectiveness of current and future regulations.
Sources:
International Agreement Needed on Nuclear Security Standards, NNSA Chief Says
http://www.nti.org/d_newswire/issues/2008/9/18/2DC031E3-0221-4F30-BFE0-14C4795EC6B1.html
Abolishing Nuclear Weapons
http://www.iiss.org/publications/adelphi-papers/2008-adelphi-papers/abolishing-nuclear-weapons/
Study Demands Commitment to Nuclear Disarmament
http://www.nti.org/d_newswire/issues/2008/9/18/E44A3825-D295-4E29-B20B-E25BFC484AB0.html
World Institute for Nuclear Security
http://www.nti.org/b_aboutnti/b7_WINS.html

[338] International Nuclear Safety Regime Review

Military Implications:
Relevant military personnel should study the guide for international nuclear security-related issues, and arrange to have the copies of the follows year's report delivered for study.
Sources:
CIGI Publishes First-Of-Its-Kind Nuclear Guide
http://pr-usa.net/index.php?option=com_content&task=view&id=130760&Itemid=30
A Guide to Global Nuclear Governance: Safety, Security and Nonproliferation
http://www.igloo.org/cigi/download-nocache/Publications/research/nucleare/test/testa/global_nuc

[339] New Technologies Need New Regulations Systems

Military Implications:
Since the risks raised by the development and use of synthetic biology and other new technologies are increasing, new international regulations seem inevitable. Relevant military personnel working on safety issues related to new technologies should consider collaboration with such initiatives as the Synthetic Biology Project and relevant international organizations for establishing international safety standards and should anticipate potential regulations in the planning of future R&D in these areas. Simultaneously, it should also investigate measures for identifying potential negative consequences and design protective procedures.
Sources:

New Life, Old Bottles: Regulating First-Generation Products of Synthetic Biology
http://www.synbioproject.org/process/assets/files/6319/nano_synbio2_electronic_final.pdf
Synthetic Biology Project—publication announcement
http://www.synbioproject.org/library/publications/archive/synbio2/

[340] The Woodrow Wilson International Center Opens Synthetic Biology Project

Military Implications:
Relevant military personnel working on biological and chemical safety issues should consider collaboration with such initiatives.
Sources:
Synthetic Biology: Is Ethics a Showstopper?
http://www.wilsoncenter.org/index.cfm?fuseaction=events.event&event_id=492968
Synthetic Biology Project
http://www.synbioproject.org/about/
WMD Detection Facility Opens in Singapore
http://gsn.nti.org/gsn/nw_20090121_2237.php

[341] Geo-engineering Promises/Threatens Major Consequences

Military Implications:
The military should be aware of geo-engineering proposals, and be prepared to participate in discussions of policies concerning them.
Sources:
Re-Engineering the Earth
http://www.theatlantic.com/doc/200907/climate-engineering
Scientists Debate Shading Earth As Climate Fix
http://www.npr.org/templates/story/story.php?storyId=105483423
Geoengineering Options to Respond to Climate Change: Input to the Workshop and Suggested Reading
http://americasclimatechoices.org/Geoengineering_Input/GeoInputHome.html

Nanotechnology

[343] Corporations under Stockholder Pressure for Nanotech Disclosure

Military Implications:
Military concerned with nano risk assessment of contractor materiel should be on the alert for instances of this popular movement, and be prepared to take advantage of any subsequent disclosures.
Sources:
Increase Expected in Shareholder Resolutions Urging Disclosure of Nanomaterials, Policies -- The Bureau of National Affairs' Daily Environment Report (1/15/2009)

http://news.bna.com/deln/DELNWB/split_display.adp?fedfid=11312763&vname=dennotallissues&fn=11312763&jd=A0B7U4H4J7&split=0 (subscription required)

[344] UN Report Assesses Nanotech and Climate Change

Military Implications:
Military personnel concerned with nanotech and energy efficiency issues should review this report and consider its findings and recommendations in their planning.
Sources:
Innovation in Responding to Climate Change: Nanotechnology, Ocean Energy and Forestry
http://www.ias.unu.edu/sub_page.aspx?catID=8&ddlID=738
Innovation in Responding to Climate Change: Nanotechnology, Ocean Energy and Forestry
http://www.ias.unu.edu/resource_centre/Innovation%20in%20Responding%20to%20Climate%20Change_UNU-IAS%20Report.pdf

[345] Study of Scientists' and Public's Views of Nanotechnology

Military Implications:
Relevant military personnel should consider the study's outcomes for input in establishing standards and safety procedures concerning nanotechnology.
Sources:
Of risks and regulations: how leading U.S. nanoscientists form policy stances about nanotechnology
http://www.springerlink.com/content/627323076677745q/fulltext.html
Scientists and Public Differ on Views about Nanotechnology Regulation
http://www.news.wisc.edu/releases/15361

[346] New Policy Brief: Appropriate Risk Governance Strategies for Nanotechology Applications in Food and Cosmetics

Military Implications:
Relevant military personnel should consider the brief for input in establishing standards and safety procedures concerning nanotechnology manufacturing.
Sources:
Appropriate risk governance strategies for nanotechnology applications in food and cosmetics
http://www.irgc.org/Appropriate-risk-governance.html
Appropriate Risk Governance Strategies for Nanotechnology Applications in Food and Cosmetics
http://www.irgc.org/IMG/pdf/IRGC_PBnanofood_WEB.pdf

[347] New OECD Report on Nanotech Risks in the Workplace

Military Implications:

Relevant military personnel should consider the report for input in establishing standards and safety procedures concerning nanotechnology manufacturing.
Sources:
OECD Addresses Shortfalls in Measuring Exposure to Nanomaterials in Workplace
http://www.merid.org/NDN/more.php?id=1859
Preliminary Analysis of Exposure Measurement and Exposure Mitigation in Occupational Settings: Manufactured Nanomaterials, report
http://www.olis.oecd.org/olis/2009doc.nsf/LinkTo/NT000029E6/$FILE/JT03263204.PDF

348 International Approaches to the Regulatory Governance of Nanotechnology

Military Implications:
[Same as previous on this issue] Relevant military personnel should review the information generated by such 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:
International Approaches to the Regulatory Governance of Nanotechnology (report)
http://www.carleton.ca/regulation/publications/Nanotechnology_Regulation_Paper_April2009.pdf
International approaches to the regulatory governance of nanotechnology
http://www.nanowerk.com/news/newsid=10642.php

349 Wide Use of Nano-Silver Raises Health and Environmental Issues

Military Implications:
The military should carefully follow studies of this potentially hazardous substance and, if appropriate, consider taking measures to control its use in military materiel.
Source:
Nano & Biocidal Silver
http://www.foe.org/sites/default/files/Nano-silverReport_US.pdf
Nano-silver: Extreme Germ Killer Presents Growing Threat to Public Health
http://www.foe.org/nano-silver-extreme-germ-killer-presents-growing-threat-public-health

350 EU Parliament Recommends Stronger Nanotech Precautions

Military Implications:
Military in the European Theater should prepare themselves for the possibility of more stringent regulations in the future on the manufacture and use of nanomaterials.
Sources:
European Union Should Review Regulations Governing Nanomaterials, Parliament Says
http://www.merid.org/NDN/more.php?id=1866
EU Parliament wants tighter nano regulation
http://euobserver.com/9/28015/?rk=1

[351] New EU Committee Report Very Critical of Nanotech Regulation

Military Implications:
The military should note the recommendations in the report and be prepared for tighter controls in the EU on the use of nanomaterials.
Sources:
Nanoforum Newsletter No. 39, February 2009
http://www.nanoforum.org/nf06~modul~loadin~folder~8074~sent~~step~~.html? (free registration required)
DRAFT REPORT on regulatory aspects of nanomaterials (2008/2208(INI))
Committee on the Environment, Public Health and Food Safety
http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+COMPARL+PE-418.270+01+DOC+PDF+V0//EN&language=EN

[352] Report on Ethical Evaluations of Nanotechnology

Source:
Ethical Evaluations of Nanotechnology
http://www.nanotechproject.org/news/archive/ethical_evaluations_nanotechnology/

[353] New Review of Analytical Methods to Assess Nanoparticle Toxicity

Military Implications:
Relevant military personnel should evaluate the methods to determine their utility in assessment of potential toxicity, carcinogenicity or other effects related to nanotechnology.
Source:
Analytical methods to assess nanoparticle toxicity
http://www.rsc.org/Publishing/Journals/AN/article.asp?doi=b818082b

[354] ObservatoryNANO Annual Report Published

Military Implications:
Military personnel concerned with nanotechnology should consider the report for additional input in the field.
Source:
ObservatoryNANO Annual Report
http://www.observatorynano.eu/project/catalogue/9AR/

[355] EU ObservatoryNANO Project in Expanded Operation

Military Implications:
Military personnel concerned with nanotechnology should monitor this site to keep in touch with current developments in the field.

Source:
EU ObservatoryNANO Project
http://www.observatory-nano.eu

[356] EU to Fund Nanoparticle Environmental Risk Study

Military Implications:
Military personnel concerned with nanotech risk assessment should follow the ENNSATOX investigations and be prepared to take action based on its findings, and also be prepared for possible eventual regulations on nanoparticle usage.
Sources:
ENNSATOX: http://insciences.org/article.php?article_id=770
Sunscreen danger: Holidaying feds leave bathers waiting for suspect sunscreen list
http://www.theage.com.au/national/holidaying-feds-leave-bathers-waiting-for-suspect-sunscreen-list-20081227-75x6.html?page=-1

[357] European Nanotech Safety Proceedings Published

Military Implications:
Military personnel concerned with nanotech risk assessment should review the proceedings and eventually consider the findings and recommendations in their planning.
Sources:
2nd Annual Nanotechnology Safety for Success Dialogue Workshop, 2-3 October 2008
http://ec.europa.eu/health/ph_risk/ev_20081002_en.htm
Nano. Safety for Success Dialogue report
http://ec.europa.eu/health/ph_risk/documents/ev_20081002_rep_en.pdf

[358] New EU Study on Regulation and Governance of Nanotechnologies

Military Implications:
Relevant military personnel might consider the report as a "one-stop" shop for European nanotech-related regulations, and also as an indication of what might become global regulations at some point.
Sources:
Mapping Study on Regulation and Governance of Nanotechnologies
http://www.innovationsgesellschaft.ch/media/archive2/publikationen/FramingNano_MappingStudy.pdf
FramingNano Mapping Study on Nanotechnologies Regulation and Governance Released
http://www.innovationsgesellschaft.ch/index.php?section=news&cmd=details&newsid=157&teaserId

[359] European Report on Workplace Exposure to Nanoparticles

Military Implications:
Relevant military personnel should consider the report for input concerning worldwide research and findings related to nanotechnology safety and therefore potential future standards and regulations.
Sources:
Literature Review - Workplace exposure to nanoparticles
http://osha.europa.eu/en/publications/literature_reviews/workplace_exposure_to_nanoparticles

[360] SAFENANO Publishes First Global Review of EHS Risks of Nanotechnology

According to an article in Nanowerk News, Defra, the UK Government Department for Food &
Military Implications:
Relevant military personnel should consider the report for input concerning worldwide research and findings related to nanotechnology safety and therefore potential future standards and regulations.
Sources:
EMERGNANO: A review of completed and near completed environment, health and safety research on nanomaterials and nanotechnology report
http://www.safenano.org/Uploads/EMERGNANO_CB0409_Full.pdf
SAFENANO team completes global review of nanomaterial EHS research
http://www.nanowerk.com/news/newsid=10088.php

[361] National Research Council Calls for Better Nanotech Risk Assessment

Military Implications:
Military personnel concerned with nanotech risk assessment should review this report and consider its findings and recommendations in their planning and assessments.
Sources:
Federal Research Plan Inadequate to Shed Light on Health and Environmental Risks Posed by Nanomaterials (News release)
http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=12559
Review of Federal Strategy for Nanotechnology-Related Environmental, Health, and Safety Research report
http://www.nap.edu/catalog.php?record_id=12559

[362] New report on Oversight of Next Generation Nanotechnology

Military Implications:
[Same as previous on this issue] Relevant military personnel should review the information generated by such 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.
Source:

Former EPA Official Calls For New Environmental & Consumer Protection Agency
http://www.nanotechproject.org/news/archive/davies4/

[363] EPA to Require Company Nanotube Use or Import Notices

Military Implications:
The military should ensure that it and its contractors are prepared to comply with similar current or future requirements in other jurisdictions where it or its contractors operate.
Source:
EPA to Enforce Premanufacture Reviews for Carbon Nanotubes Beginning March 1
http://www.merid.org/NDN/more.php?id=1728

[364] California Requests Nanotube Safety Data

Military Implications:
The military should investigate to see if it can obtain access to the data obtained from these requests to use the information in nanomaterials risk assessment.
Sources:
California Gives Carbon Nanotube Makers One Year to Provide Toxicity, Other Data
http://www.merid.org/NDN/more.php?id=1686 (abstract)
Canada first country to ask companies to report use of nanomaterials
http://www.standard-freeholder.com/ArticleDisplay.aspx?e=1409797

[365] Russia Introduces Nanotechnology Certification System

Military Implications:
Appropriate military representatives in Moscow should contact the Russian Corporation of Nanotechnologies to establish liaison with this new institution in order to exchange ideas on nanotechnology risk assessment.
Source:
Russia introduces NANOCERTIFICA, its own nanotechnology certification system
http://www.nanowerk.com/news/newsid=7893.php

[366] Pressure Increases in Australia for Nanotech Safety Regime

Military Implications:
Australia is only the latest instance of this movement; the military should prepare itself for increased nanotech regulation in countries around the world.
Source:
Calls to protect workers from nano risks
http://www.abc.net.au/science/articles/2009/03/24/2524875.htm

[367] New South Wales Pushes for Nanotech Risk Protection

Military Implications:
[Same as previous on this issue] Relevant military personnel should review the information generated by such 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.
Source:
NSW pushes for nano risk labels
http://www.smh.com.au/national/nsw-pushes-for-nano-risk-labels-20090504-asmk.html?page=1

[368] China Moves Strongly into Nanotech Arena

Military Implications:
The military should closely follow the development of Chinese nanotech risk assessment and mitigation policy, and should consider working with the Chinese military on questions of the military's role in nanotech environmental health and safety issues.
Source:
China's giant step into nanotech
http://www.guardian.co.uk/technology/2009/mar/26/nanotechnology-china

[369] New Estimation Technique for Nanoparticles in the Environment

Military Implications:
[Same as previous on this issue] Relevant military personnel should review the information generated by such 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.
Source:
Novel Approach Estimates Nanoparticles In Environment
http://news.duke.edu/2009/05/nanotitan.html

[370] Comparison of Micro- and Nano-particles' Toxicity to Cells

Military Implications:
The military should follow this research in order to be able to take these factors into account in nanotech environmental risk assessments.
Sources:
Bacterial toxicity comparison between nano- and micro-scaled oxide particles
http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6VB5-4VGW7M2-1&_user=10&_rdoc=1&_fmt=&_orig=search&_sort=d&view=c&_acct=C000050221&_version=1&_urlVersion=0&_userid=10&md5=b422b89cdc653ab8474130db850abf65
Size matters. Comparing the toxicity of micro- to nanoparticles
http://www.nanowerk.com/spotlight/spotid=10128.php

[371] Comprehensive Overview of Nanomaterial Properties and Biological Interactions

Military Implications:
The military should consider follow any investigations into this problem, and take it into account the risk assessments.
Source:
Research explores interactions between nanomaterials, biological systems
http://newsroom.ucla.edu/portal/ucla/exploring-the-world-of-nanomaterial-94257.aspx
Paper: http://www.nature.com/nmat/journal/v8/n7/full/nmat2442.html (by subscription only)

[372] Environmental Effects from Nanomaterial Production May Outweigh Its Benefits

Military Implications:
The military should closely follow any investigations into this problem, and take it into account the risk assessments.
Source:
Nanomaterials May Have Large Environmental Footprint
http://www.physorg.com/news143907040.html

[373] Evidence of Damage to Beneficial Microbes from Nanoparticles

Military Implications:
Military personnel conducting nanotech risk assessments should review these results and consider them in carrying out their work.
Source:
Nanoparticles from sunscreens damage microbes
http://www.environmentalhealthnews.org/ehs/news/nanoparticles-damage-microbes

[374] New Study on the Carcinogenicity of Nanoparticles and Other Dusts

Military Implications:
The military should review this work and follow its continuation, to assess its further relevance to nanotech risk assessment.
Source:
Research on the carcinogenicity of nanoparticles and other dusts
http://www.nanowerk.com/news/newsid=6393.php

[375] EU Tightens Safety Precautions on Nano-containing Cosmetics

Military Implications:
Although cosmetics are of only peripheral concern to the military, these new regulations undoubtedly portend further restrictions on other classes of products containing nanomaterials. The military should be sure that it is prepared to deal with future legislation and regulation in the U.S. and abroad.
Source:

Cosmetics companies to face new rules in Europe
http://www.iht.com/articles/ap/2009/03/24/business/EU-EU-Parliament-Cosmetics.php

[376] New Study Shows Nanoparticles In Sewage Could Escape Into Bodies Of Water
Military Implications:
Previous risk assessment studies of nanoparticles in sewage should be reviewed to see if their results need modification because of this new work.
Source:
Nanoparticles In Sewage Could Escape Into Bodies Of Water
http://www.sciencedaily.com/releases/2008/07/080724221823.htm

[377] New Study of Nanomaterials and Plant Toxicity
Military Implications:
The military should follow these and similar investigations to add this new aspect to nanotech risk assessment to their deliberations.
Sources:
Starting to explore nanotechnology's impact on major food crops
http://www.nanowerk.com/spotlight/spotid=9516.php
Nanoparticle uptake by plants
http://www.nanowerk.com/spotlight/spotid=6331.php

[378] New Batteries Raise Health/Safety Worries about Lithium Nanoparticles
Military Implications:
The military should closely follow any investigations into this problem, and take results into account in risk assessment for these units.
Source:
Lithium-ion Nanomaterial Batteries: Our new hope with a dose of caution
http://www.nanotech-now.com/columns/?article=250

[379] High Aspect Ratio Nanoparticles May Pose Asbestos-like Risks
Military Implications:
Military personnel concerned with nano risk assessment should follow this and subsequent research, and take its results into consideration in their evaluations of nanomaterials.
Sources:
UK report: http://randd.defra.gov.uk/Document.aspx?Document=CB0406_7760_FRP.pdf
News story on Chinese report: http://www.eurekalert.org/pub_releases/2008-12/sicp-soc122208.php
Chinese paper:
http://www.springerlink.com/content/fk685595n1583u88/?p=2fa06998388d4e45bda7cd2febc9272f&pi=0
News story on UK report: http://www.nanowerk.com/news/newsid=8996.php

CL Tran, SM Hankin, B Ross, RJ Aitken, AD Jones, K Donaldson, V Stone, R Tantra, 2008, "An outline scoping study to determine whether high aspect ratio nanoparticles (HARN) should raise the same concerns as do asbestos fibres" (pdf, 1.67MB), Report on DEFRA project CB0406 is free to download.
French action:
http://translate.google.com/translate?hl=en&sl=fr&u=http://fr.news.yahoo.com/2/20090121/thl-nanotubes-de-carbone-le-haut-conseil-96993ab.html&sa=X&oi=translate&resnum=1&ct=result&prev=/search%3Fq%3Dhttp://fr.news.yahoo.com/2/20090121/thl-nanotubes-de-carbone-le-haut-conseil-96993ab.html%26hl%3Den%26safe%3Doff%26client%3Dfirefox-a%26rls%3Dorg.mozilla:en-US:official%26hs%3Dukj

[380] Possible Environmental Hazard from Quantum Dots

Military Implications:
Health and environmental risk assessment personnel should review military and contractor use of these components to evaluate possible hazards.
Sources:
Quantum Dot Weathering Results in Microbial Toxicity
http://pubs.acs.org/doi/abs/10.1021/es8023385
Quantum dots may be toxic to cells, environment under certain conditions
http://www.nanowerk.com/news/newsid=9059.php

[381] Diesel Exhausts Emit Nanoparticles Affecting Lung Function
Military Implications:
Nano-sized particles are not covered by current pollution regulations, but these results may very well later change that situation. The military should review its use of diesel engines and plan for the possibility of future regulations affecting them.
Sources:
Unregulated nanoparticles from diesel engines inhibit lungs
http://www.physorg.com/news138462352.html
UK wins $2 million EPA grant
http://www.kentucky.com/211/story/496040.html

[382] Survey of Nanotube Toxicity to Immune Systems

Military Implications:
[Same as previous on this issue] Military personnel concerned with nanotech issues should contribute their views to these activities. Also, relevant military personnel should review the information generated by such 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:
Exploring the Immunotoxicity of Carbon Nanotubes
http://www.springerlink.com/content/g4u1716412126840/

[383] UK Report on Novel Materials in the Environment: The case of nanotechnology
Military implications:
Military personnel concerned with nanotech risk assessment should review these reports for useful ideas on assessment policies and procedures.
Source:
Novel Materials in the Environment: The case of nanotechnology
http://www.rcep.org.uk/novelmaterials.htm

[384] Proposal for Establishing an Arab Council on Nanotechnology (ACON)
Military Implications:
[Same as previous on this issue] Relevant military personnel should review the information generated by such 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:
Al-Quds Nanotech Research Lab
http://www.eng.alquds.edu/nrl/nrl_site.swf
Call to set up a nanotech Arab body
http://www.gulf-times.com/site/topics/article.asp?cu_no=2&item_no=291882&version=1&template_id=36&parent_id=16

[385] Tunisian Nanotech Association Formed
Military Implications:
Appropriate military personnel in Tunis should establish contact with the Association and the Environmental Centre for the exchange of ideas on nanotech risk assessment.
Sources:
Meridian Nanotechnology and Development News, Headlines for: 12/19/2008
Tunisia: Environmental Use of Nanotechnologies Highlighted in Tunis Seminar
http://allafrica.com/stories/200812180921.html

[386] New Paper Reviews Aspects of Public Perception of Nanotech
Military Implications:
Military public communications personnel should review this paper for ideas on communicating with the public on military applications of nanotechnology.
Sources:
Hearts and Minds and Nanotechnology
http://www.merid.org/NDN/more.php?id=1757
Public perceptions of nanotechnology
www.nature.com/nnano/journal/v4/n3/full/nnano.2009.16.html (purchase or subscribe)

[387] New Book Studies Media and Nanotechnology
Military Implications:

Military personnel concerned with public communications should review this work for ideas on proper techniques for informing the populace about nanotechnology, particularly its risks.
Sources:
Nanotechnology, Risk and Communication
http://www.palgrave.com/products/title.aspx?PID=277172

[389] International Environmental Nanotechnology Conference 2008

Military Implications:
[Same as previous on this issue] Military personnel concerned with nanotech issues should contribute their views to these activities. Also, relevant military personnel should review the information generated by such 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:
International Environmental Nanotechnology Conference: Applications and Implications
http://emsus.com/nanotechconf/index.htm

[390] European Nanotech Meetings to Be Held in June and September 2009

Military Implications:
Military personnel in the European theater concerned with nanotechnology should consider attending these meetings, to learn of current developments in European nanotech and policy and to report back to relevant personnel in the U. S.
Source:
EuroNanoForum 2009. Nanotechnology for Sustainable Economy
European and International Forum on Nanotechnology, 2-5 June, 2009, Prague, Czech Republic
http://www.euronanoforum2009.eu/
Nanotech Europe 2009, Berlin, 28-30 September 2009
http://www.nanotech.net/

[391] EuroNanoForum 2009 to Be Held in Prague, June 2-5, 2009,

Military Implications:
Military personnel in the continental U.S. and in Europe with nanotech- and environment-related responsibilities should consider attending this event to keep apprised of the latest developments in the field.
Source:
EuroNanoForum 2009
http://www.euronanoforum2009.eu/

[392] Nanoparticle Warnings at Euroscience Open Forum

Military Implications:

These talks are likely to increase the pressure for greatly increased research on nanotech risk assessment and for stricter controls on those substances.
Source:
Nanotech risk concerns 'must be addressed'
http://www.enn.com/top_stories/article/37738

[393] European Nanotechnology Conference in Switzerland in September 2008
Military Implications:
Military personnel in the European Theater who are concerned with nanotech developments should consider attending this event.
Source:
Meeting Place for Innovations
http://www.nanoeurope.com/wEnglisch/messen/nanoeurope/01_besucher/home/home.php

[394] Indian Conference on Nanotechnology and Regulatory Issues
Military Implications:
Members of the military in South Asia and concerned with environmental and regulatory aspects of nanotech should consider attending this meeting, to learn about the current state of these topics in India.
Source:
National Conference on Nanotechnology and Regulatory Issues
http://www.scidev.net/en/announcements/national-conference-on-nanotechnology-and-regulato.html

[395] US/Africa/Caribbean Nanotech Conference to Be Held
Military Implications:
Relevant military personnel should consider following the outcomes of the workshop as an indication on how nanotech is developed in the other regions and for eventual implications relevant to security and preventive health.
Source:
Invitation: US-African and Caribbean Nanotechnology Initiative (USACANI) Workshop.
http://www.fonai.org/News.html

[396] International Nanotech Workshop to Precede June Prague Meeting
Military Implications:
Military personnel in the European theater concerned with nanotechnology should consider attending these meetings, to learn of current developments in European nanotech and policy and to report back to relevant personnel in the U.S.
Source:
1st ICPC NanoNet Workshop
http://www.icpc-nanonet.org/content/category/6/40/91/

[397] Research Awards on Nanotech and Energy Presented to Nine Projects

Military Implications:
[Same as previous on this issue] Relevant military personnel should review the information generated by such 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.
Source:
Research Awards on Nanotech and Energy
http://www.eon.com/en/unternehmen/21278.jsp
Accolade for solar-hydrogen project
http://www.physorg.com/news161870957.html

Underwater Sounds from Human Sources Endangering Marine Life

[399] U.S. Supreme Court Rules in Favor of Navy in Sonar Case

Military Implications:
[Similar to previous on this issue] Not withstanding the Supreme Court's decision, continuous research producing additional evidence of dangers, as well as increasing advocacy from conservation groups, might trigger negotiations for an international ban. In the meantime, monitoring of marine mammals' presence in areas of sonar use should be incorporated in Navy policy to allow for responsiveness in the event that further changes of policy were to occur.
Sources:
Navy Wins, Whales Lose U.S. Supreme Court Sonar Case
http://www.ens-newswire.com/ens/nov2008/2008-11-12-10.asp

POLLUTION

[401] Microplastics Recognized as Environmental Threat to Oceans

Military Implications:
The military should keep in touch with continuing work on this area through contacts with such organizations as the Univ. of Washington's Center for Urban Waters and NOAA's Marine Debris Program, in anticipation of possible future environmental protection measures related to this threat.
Sources:
International scientists to discuss effects of 'microplastics' on marine environment
http://www.tacoma.washington.edu/news/2008_0903.cfm
Why small plastic particles may pose a big problem in the oceans
http://pubs.acs.org/cgi-bin/sample.cgi/esthag/asap/html/es802970v.html

[402] Health Hazards from "Environment-friendly" Reusable Bags

Military Implications:
Military organizations attempting to help the environment through the use of reusable bags should ensure that proper sanitary procedures are being followed.
Sources:
"A Microbiological Study of Plastic Reusable Bags and `First or single-use' Plastic Bags"
http://www.cpia.ca/files/files/A_Microbiological_Study_of_Reuseable_Plastic_Grocery_Bags.pdf
Study Labels Reusable Bags as Possible Health Risk
http://earth911.com/blog/2009/06/01/study-labels-reusable-bags-as-possible-health-risk/

[403] Possibly Tainted Imported Drywall Raises Health Fears

Military Implications:
The military should track the federal (Consumer Product Safety Commission) and state investigations into this possible problem and be prepared to assess its impact on military facilities and projects (past, ongoing and planned), if necessary.
Source:
AP IMPACT: Chinese drywall poses potential risks
http://www.denverpost.com/business/ci_12122912

[404] Experts Call For Global Network to Prevent Asteroid Disasters

Military Implications:
Military personnel involved in the development of international space-based systems to protect against NEOs should review this report, if not already accomplished, for input to increasing international cooperative activities.
Sources:
Asteroid Threats: A Call for Global Response
http://www.space-explorers.org/ATACGR.pdf
Experts call for global network to prevent asteroid disasters
http://www.spacedaily.com/reports/Experts_call_for_global_network_to_prevent_asteroid_disasters_999.html

[405] Solar Storm Could Wipe Out Power Grid

Military Implications:
The military should ensure that it is exerting maximum effort, in cooperation with other agencies, to aid in the establishment of an adequate international early warning system to protect against such a low-probability-enormous-impact environmental catastrophe, and in setting up facilities and procedures to handle such a situation.
Sources:

Severe Space Weather Events--Understanding Societal and Economic Impacts: A Workshop Report
http://www.nap.edu/catalog.php?record_id=12507#top
Space storm alert: 90 seconds from catastrophe
http://www.newscientist.com/article/mg20127001.300-space-storm-alert-90-seconds-from-catastrophe.html?full=true

NEW INITIATIVES AIMING TO INCREASE ECO-EFFICIENCY

[407] EU-US Joint Energy-Efficiency Standards for Office Equipment

Military Implications:
Military acquisition departments, contractors, and manufacturers should make sure that office equipment complies with the Energy Star program's stipulations.
Sources:
EU and US Reinforce Energy Efficiency Standards for Office Equipment
http://www.eurunion.org/eu/index.php?option=com_content&task=view&id=3417&Itemid=58
EU-US Energy Star Program
http://www.eu-energystar.org/en/index.html

[408] Global Investment Road Map for a Transition to a Greener Economy Launched by UNEP

Military Implications:
R&D results from the Defense Advanced Research Projects Agency (DARPA) and related research centers should be reviewed for potential inputs to the evolving investment road map. The road map should also be reviewed for potential investments and applications for the military and its contractors.
Sources:
"Global Green New Deal" - Environmentally-Focused Investment Historic Opportunity for 21st Century Prosperity and Job Generation
http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=548&ArticleID=5957&l=en
Landmark New Report Says Emerging Green Economy Could Create Tens of Millions of New "Green Jobs"
http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=545&ArticleID=5929&l=en

[409] Green Economy a Solution for Addressing the Global Economic Crises

Military Implications:
The Defense Advanced Research Projects Agency should explore how it could accelerate R&D for green technology and coordinate with related efforts of the national labs, National Science

Foundation, and key technology firms to play its role in creating the future green technologies and fulfilling the military's potential requirements for technology transfer.
Sources:
Ban urges leaders at Davos to forge 'Green New Deal' to fight world recession
http://www.un.org/apps/news/story.asp?NewsID=29712&Cr=Ban&Cr1=Climate+change
World Economic Forum Report: US $515 Billion needed in Green Investments
http://www.investorideas.com/news/012909f.asp
World Economic Forum 2009, Davos
www.reuters.com/davos
World Economic Forum Explores Green Strategies for Recovery
http://www.ens-newswire.com/ens/jan2009/2009-01-29-02.asp
The other global warming
http://www.boston.com/bostonglobe/ideas/articles/2009/01/25/the_other_global_warming/

[410] Global Fuel Economy Initiative Aims to Increase Cars' Fuel Efficiency 50% by 2050

Military Implications:
The '50 by 50' initiative is likely to represent a base for discussions and setting binding targets for the global auto industry. The military should continue to collaborate with its contractors to speed up the introduction of fuel-efficient vehicles.
Sources:
'50 by 50' Global Fuel Economy Initiative
http://www.fiafoundation.org/50by50/Documents/50BY50_report.pdf
International Agencies Launch 50% Global Fuel Economy Plan to Key Industry Players at Geneva Motor Show
http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=562&ArticleID=6097&l=en
UN-backed roadmap for halving auto emissions unveiled in Geneva
http://www.un.org/apps/news/story.asp?NewsID=30083&Cr=greenhouse&Cr1
Halve emissions from cars by 2050, auto industry told
http://www.guardian.co.uk/environment/2009/mar/04/auto-industry-emissions