

WORLDWIDE EMERGING ENVIRONMENTAL ISSUES AFFECTING THE U.S. MILITARY
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NOVEMBER 2005 REPORT

Note to Readers: Pages 1-14 comprise the summary and analysis of this report. Expanded details for some items that might not be available via the Internet are in the Appendix.

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Item 1. Human Security Proposed as Reorganizing Principle for the UN

The UN was organized 60 years ago around the principle of preventing national wars. Today it should be reorganized around the principle of addressing human security, which would reinvent global governance, proposes former Canadian foreign minister, Lloyd Axworthy. A UN cohesive response system able to rapidly deploy aid when and where necessary is needed now to efficiently respond to current civil conflicts and disasters.

Military Implications:

There may be an emerging consensus that human security could be the next organizing principle for international relations. Whether or not Lloyd Axworthy will promote the idea in the UN General Assembly, the idea of re-organizing the UN on human security issues could well be inevitable. The military should create alternative scenarios for such potential UN restructuring and study how it might contribute to and be affected by each scenario.

Source:

Former foreign minister wants to “re-wire” UN

By Fabian Schweyher, The Budapest Times, November 21, 2005

<http://www.budapesttimes.hu/index.php?art=1286> (article available for a limited time on the website; full text in the [Appendix](#))

Item 2. International S&T Information System Proposed

To help resolve the conflict between protecting intellectual property rights and maximizing social benefits from public investments in research around the world, the International Council for Science's (ICSU's) Committee on Data for Science and Technology (CODATA) has proposed the Global Information Commons for Science Initiative. This initiative was launched at the World Summit on the Information Society held this month in Tunis, Tunisia, after being formulated at ICSU's annual meeting held in October, in Suzhou, China. The international S&T information system would help develop and implement “new policy guidelines and legal structures that will promote collaboration in a variety of research domains... [and could produce] a productive balance between private research and development, and publicly funded open science,” says Paul David, an economist at Stanford University.

Military Implications:

This new initiative could open new avenues to advance environment-related research to enhance environmental security. Relevant military personnel in Paris might monitor ICSU's progress for eventual implications for environmental security research disclosure and collaboration.

Sources:

Global project seeks to promote access to science

David Dickson, Source: SciDev.Net, 17 November 2005

<http://www.scidev.net/News/index.cfm?fuseaction=readNews&itemid=2484&language=1>

The Global Information Commons for Science Initiative

<http://www.codata.org/wsis/GlobalInfoCommonsInitiative.html>

Global forum for free sharing of research data planned

<http://www.scidev.net/News/index.cfm?fuseaction=readNews&itemid=2435&language=1>

Item 3 Technological Breakthroughs with Environmental Security Implications

3.1 New On-the-spot Test for Avian Flu and Other Influenza Strains

Scientists at the University of Colorado are perfecting a new “chip” that can test almost instantly for 11 different influenza strains, including avian flu. The test device was already developed and tested for accuracy by the Centers for Disease Control and Prevention and researchers are working now to develop it into a user-friendlier on-the-spot test for influenza. Currently available technologies either take a long time to get a diagnosis of specific influenza strains; or, if giving faster results, do not differentiate among influenza strains.

Military Implications:

This new technology has tremendous applications in case of a pandemic or biological attack and has the potential to provide better global influenza surveillance by easy and fast identification of strains. Also, as strains tend to mutate, this technology could help faster identification of any changes. If not already being done, relevant military personnel should consider cooperation with the researchers to speed up the implementability of this new technology.

Source:

New "chip" could provide quick bird flu test

<http://go.reuters.com/newsArticle.jhtml?type=technologyNews&storyID=10190863&src=rss/technologyNews> (article available for a limited time on the website; full text in the [Appendix](#))

3.2 Chinese Find 16 Native Toxin-absorbing Plants

Chinese scientists studied over 5,000 native plant species for their abilities to remove toxins (mainly heavy metals) from the environment. The five-year study identified 16 plants that could safely clean up pollutants such as arsenic or heavy metals, as well as techniques to process the resulting heavy-metal-absorbing plants so that they don't become another pollution problem. The study estimated that using these plants costs less than one-tenth as much as the current chemicals-based cleanup techniques. One of the scientists said that “genes from the species identified could be used to genetically modify other plants” and hence, could enlarge the scope and spectrum of pollution-cleaning plants.

Military Implications:

Along with other similar plant-based cleanup techniques, the plants identified and eventually adapted by the Chinese should be considered—in the regions where applicable—as cost-effective and eventually cleaner soil pollutant removal techniques.

Source:

China's five-year hunt for toxin-absorbing plants ends

<http://www.scidev.net/dossiers/index.cfm?fuseaction=dossierReadItem&type=1&itemid=2485&language=1&dossier=11&CFID=5187246&CFTOKEN=73c840a863493c12-427E991D-B0D0-F03F-734651F39BDA904D>

3.3 Possible Cure for Bird Flu

A scientist from the Laboratory of New Veterinary Drugs at the Lanzhou Institute of Animal Husbandry and Veterinary Drugs, part of the Chinese Academy of Agricultural Sciences, declares that he has used traditional Chinese medicine to develop a plant extract—hypercine—that can effectively treat poultry infected with the bird flu virus H5N1. The extract proved efficient in all cases tried on poultry and is now in testing on rats for eventual efficacy for humans.

Military Implications

If not already done, the military should soon evaluate the efficacy claims for hypercine in treating H5N1 and/or determine the impacts the Chinese research has for carrying out mass treatments.

Source:

Plant extract 'protects chickens from bird flu'

<http://www.scidev.net/content/news/eng/plant-extract-protects-chickens-from-bird-flu.cfm>

3.4 Genetically Engineered Vegetables as Vaccination System to Counter Bioterrorism

At a meeting of the G-7 and WHO to discuss weapons of mass destruction and avian flu threats, Italian researchers launched the idea of a “vegetable-vaccination” by incorporating pathogens’ DNA into various vegetables’ genetic strings (such as potatoes and carrots), which when eaten would help produce antibodies and boost the body’s natural defense system against the pathogens.

Military Implications:

US-Italian cooperation to combat infectious disease began in April 2003. If not already included in these activities, relevant military personnel should consider full collaboration on this novel counter to bioterrorism.

Source:

G-7 and WHO Meet to Discuss WMD, Avian Flu Threats

http://www.nti.org/d_newswire/issues/2005_11_18.html#D55B4003

3.5 New Promises for Flexible Solar Cells

Researchers at Wake Forest University's Center for Nanotechnology and Molecular Materials have developed an organic solar cell technology (cells are as thin as a coat of paint) with almost 6% efficiency in turning sunlight into useful electrical power. The new technology might be available to consumers in about five years. [See related item *Flexible Plastic Solar Cells Converting 30% of Sun's Power into Usable Energy* in January 2005 environmental security report]

Military Implications:

[Same as previous on similar issues] Military applications of such a new technology are diverse, ranging from a ‘portable recharger’ to devices that ‘see’ in the dark, to new renewable energy sources. The military should contact the research team and/or follow the developments of this discovery for eventual adaptation and introduction of it in the design of new equipment.

Source:

Nanotechnology Center Makes Flexible Solar Cell Breakthrough

<http://www.ecniamag.com/article.asp?id=5462>

3.6 Infrared Radiation for Deicing Aircrafts Cuts Pollution

A system for cutting pollution by deicing aircraft with infrared radiation rather than chemicals is being further tested at the Oslo airport. This heat-inducing system replaces the present technique of spraying the aircraft with anti-freeze or glycol, which pollutes the environment. The InfraTek Radiant Energy Deicing System is built by the Radiant Energy Corp. of Port Colborne ON, and is already in use at Newark International Airport, and at Rhinelander-Oneida County Airport, Wisconsin, with a hangar under construction at JFK.

Military Implications.

If not already aware of this new technology, relevant military aviation personnel should investigate the use of this technique.

Source:

Pollution-Cutting Infrared System for De-Icing Aircraft Tested at Oslo Airport
<http://www.enn.com/today.html?id=9124>

Item 4. Updates on Previously Identified Issues

4.1 Nanotech Health, Safety, and Environment Working Group Set Up by ISO/ANSI

A result of the inaugural meeting of the International Organization for Standardization (ISO) Technical Committee 229, Nanotechnologies, held in London, November 9-11, 2005, was the establishment of a working group on health, safety and the environment, to be convened by the United States within the American National Standards Institute (ANSI) framework. The group will work on standards for environmental issues involving nanomaterials. [See also *ISO to Establish Standardization in the Field of Nanotechnologies* in the October 2005 environmental security report.]

Military Implications

Military components with responsibility for nanotech environmental concerns should consider contacting Heather Benko, ANSI program administrator (hbenko@ansi.org; 212-642-4912) for eventual collaboration and participation in the activities of the working group.

Source:

ISO Nanotechnologies TC 229 Meets in London
U.S. to convene Working Group on Health, Safety, and the Environment
http://www.ansi.org/news_publications/news_story.aspx?menuid=7&articleid=1084

4.2 Stockholm Convention Updates

The first meeting of the Persistent Organic Pollutants Review Committee (POPRC), held in Geneva on 7-11 November 2005, determined that all five chemicals proposed for inclusion in the Convention (pentabromodiphenyl ether, chlordecone, hexabromobiphenyl, lindane, and PFOS) fulfilled the screening criteria as stipulated in Annex D of the Convention and also adopted a draft outline of the risk profile for the new POP candidates. The first meeting of the Expert Group on Best Available Techniques and Best Environmental Practices to comply with the Stockholm Convention will be held in Geneva, Switzerland, 28 November–2 December 2005. [See also *Sweden Calls for World Ban on PFOS Chemical* in June 2005, *New Chemicals Proposed to be Added to Stockholm Convention on POPs* in May 2005, and *Stockholm Convention on Persistent*

Organic Pollutants (POPs) First Meeting of the Conference of the Parties in the April 2005 environmental security scanning reports.]

This month India has ratified the Stockholm Convention, considerably increasing environmental protection in that economically fast-growing Asian country.

Military Implications

[Similar to previous on the same issue] Although the U.S. is not Party to the Convention, it should be prepared to comply with its requirements when acting in countries Party. Thus, in addition to the preparation for phaseout of the 12 already listed POPs, it should consider the military implications of the additional five newly listed substances and initiate their replacement.

Sources:

Persistent Organic Pollutants Review Committee (POPRC)

<http://www.pops.int/documents/meetings/poprc/>

First meeting of the Expert Group on Best Available Techniques and Best Environmental Practices, 28 November – 2 December 2005, Geneva, Switzerland

http://www.pops.int/documents/meetings/bat_bep/EGBATBEP1/participantinfo/default.htm

India ratifies Stockholm convention on POPs <http://southasia.oneworld.net/article/view/120912/1/>

4.3 REACH Draft Voted by the European Parliament

The draft REACH (Registration, Evaluation and Authorization of Chemicals) regulation passed the European Parliament on November 17th. Since just fewer than 300 out of more than 1,000 proposed amendments survived, the result pleased neither industrialists, nor environmentalists and the lobbying continues intensely on what might be one of the EU's most important pieces of legislation so far. As it stands now, the priority for screening potentially hazardous substances would be set by volume rather than by risk measures—as was the original plan. The British EU presidency is pushing to pass the regulation by the end of the year. However, that depends on the vote of the EU Council of Ministers due to meet on December 19th. If the Parliament's amendments are not accepted, than the bill might be sent back for a second reading and the debate would go on. [See also *The REACH Debate Continues* and other related listed items in October 2005 environmental security report.]

Military Implications:

[Same as previous on the same issue] Assessment of the REACH system's latest proposed changes and their impacts on the U.S. Forces in Europe in relation to existing SOFAs and other agreements remains important. As currently proposed, the REACH system still implies the registration of all compounds in use by military forces operating within the EU. If implemented, that could raise security issues, as well as create major record keeping problems.

Sources:

No thanks, we're European

Nov 24th 2005, Frankfurt, From *The Economist* print edition

http://www.economist.com/research/articlesBySubject/displayStory.cfm?story_id=5218539&subjectID=348924&fsrc=nwl&emailauth=%2527%2529%2520667%255CSDUA%25294%250A (by subscription only; full text in the [Appendix](#))

European Parliament backs REACH

<http://www.eupolitix.com/EN/LegislationNews/200511/6624384b-eba7-4ca2-bfe8-53222f42d9f5.htm>

FACTBOX - All about the EU Chemicals Reform Bill REACH

<http://www.planetark.com/dailynewsstory.cfm/newsid/33530/story.htm>

4.4 Global Environmentally Sound E-waste Disposal System is Needed

Environmentally Sound Management (ESM) of Electronic and Electrical Wastes (e-waste) is a new program of action for the Asia-Pacific region aiming to achieve environmentally sound disposal of e-waste and to stop illegal trafficking of hazardous e-materials. The program is supported by UNEP Basel Convention Regional Centres in China, Indonesia, and the South Pacific (SPREP-Samoa) and focuses on capacity building at regional and national levels for best implementation of the Convention, assessment of the current situation and design of best strategies to cope with e-waste in the conditions of the region's rapid development. At the program's launch festivity, the need for developing an international e-waste recycling systems along with transparent information and monitoring mechanisms to ensure accountability was highlighted.

A new study, *The Digital Dump: Exporting Reuse and Abuse to Africa*, by the Basel Action Network, based in Seattle, reports that most of the computer equipment sent from the United States to developing countries as "aid" are not usable, creating environmental problems in already challenged places. Local sources say that the port of Lagos, Nigeria, receives 400,000 used computers a month, 75% of which are junk that must be disposed of, raising environmental issues. [See related items *Two E-waste laws entered into force in the European Union* of February 2003, and *E-waste Management Directive Came into Effect on August 13, 2005* of August 2005 environmental security reports.]

Military Implications

Although the U.S. is not a party to the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, it has to ensure that it complies with the Convention's requirements when operating in one of the 166 States Parties. Also, the military should ensure the application of environmentally sound recycling procedures for disposing of its inoperative or non-salvageable electronic equipment.

Sources:

Roadmap Set for the Environmentally Sound Management of Electronic Waste in Asia-Pacific under the Basel Convention

<http://www.basel.int/press/pr251105.doc>

The Digital Dump: Exporting Re-Use and Abuse to Africa Report

<http://www.ban.org/BANreports/10-24-05/index.htm>

Technology; Poor Nations Are Littered With Old PC's, Report Says

<http://www.nytimes.com/2005/10/24/technology/24junk.html?pagewanted=print> (by subscription only; full text in the [Appendix](#))

4.5 Sunk Weapons Represent a Growing Health and Environmental Hazard

Tons of chemical weapons and ordnance abandoned at the end of World War II continue to litter the world's oceans, representing serious hazards to the environment and human health. There is no compulsory international legislation requiring full disclosure of dumping sites and long-term monitoring of those areas (the London Convention of 1972 is not retroactive and cannot affect acts that had already been executed). However, one would expect that the countries responsible would

have moral obligations and common international customary law should demand action for cleanup and protection of humans and environment against the imminent hazards that those sites represent. [See also *Chemical Munitions on San José Island, Panama* in August 2004, and *Ocean Dumping of Chemical Weapons a Continuous Threat* in January 2004 environmental security reports.]

Military Implications:

It is likely that increasing worldwide public environmental concern and activism may lead to new proposals for cleanup and/or monitoring measures. The military should cooperate with the international community in assessing the danger that the dumpsites pose today; and, since the risks increase over time, it should monitor the known chemical dumpsites and identify those that are yet unknown in order to disseminate warnings and organize safeguarding or cleanup actions.

Sources:

Decades Of Dumping Chemical Arms Leave A Risky Legacy

Special Report, Part 1: The Deadliness Below

<http://www.dailypress.com/news/dp-02761sy0oct30,0,2199000.story>

U.S. not legally bound to reveal dump sites

Contributed by: arch_Stanton, Infoshop News, October 31 2005

<http://www.infoshop.org/inews/article.php?story=20051031111213143> (article stored for a limited time on the website; full text in the [Appendix](#))

4.6 Climate Change Updates

Energy and environment ministers attending the G20 climate summit in London advocated more implementation of “clean technologies” than use of targets to tackle climate change. The 'G20' represents the nations that emit the most greenhouse gases. Global warming induced by human activities appears also to be responsible for rising global ocean levels twice as fast today as they did 150 years ago, according to a Rutgers (the State University of New Jersey) study. The ocean has been rising almost two millimeters per year in the last 200 years compared to a steady one millimeter annually for the previous 5,000 years. See also further in this report item 6.2 *Climate Change Futures: Health, Ecological and Economic Dimensions*, a comprehensive report on the implications of climate change.

Note: The Eleventh Conference of the Parties (COP 11) to the UN Framework Convention on Climate Change and the first Meeting of the Parties (MOP 1) to the Kyoto Protocol, is currently going on, from 28 November to 9 December 2005 in Montreal, Canada. About 10,000 delegates from 189 nations are participating. The December environmental security report will report on the outcomes.

Military Implications:

[Similar to previous on this topic] The incredible amount of research providing compelling evidence of the effects of greenhouse gas emissions on climate change, as well as the increased number and quality of tools providing information for policy making, will definitely boost action to curb current polluting trends. The military and its contractors should be prepared to anticipate and accommodate the necessary changes.

Sources:

G20 climate summit pushes technology not targets

<http://www.scidev.net/News/index.cfm?fuseaction=readNews&itemid=2454&language=1>

Global Warming Appears to Double Rate of Sea Level Rise

<http://www.ens-newswire.com/ens/nov2005/2005-11-25-09.asp#anchor1>

United Nations Climate Change Conference (COP 11 and COP/MOP 1)

http://unfccc.int/meetings/cop_11/items/3394.php

4.7 UN Tsunami Early Warning Systems Extended to Mediterranean, Northeast Atlantic

As part of a global tsunami warning and mitigation system, UNESCO's Intergovernmental Oceanographic Commission (IOC) launched the plans for a system for the North-Eastern Atlantic Ocean, Mediterranean and connected seas. At the first meeting of the new system's Intergovernmental Coordination Group, experts from 23 Mediterranean and Northeast Atlantic countries identified the key technical needs for the system and adopted an action plan for 2006-2007 with the aim of having an initial operational system in place by December 2007. Beyond those in the Pacific and Indian Oceans, planning is underway for one in the Caribbean. [See also *Indian Ocean Tsunami Early Warning System to be Operational by the End of 2005* in August 2005, and *Tsunami Triggers an Early Warning System for Indian Ocean and Beyond* in January 2005 environmental security reports.]

Military Implications:

[Similar to previous months on the same issue] Relevant military logistics personnel should cooperate and make recommendations for national preparedness plans and eventually update previous military plans to support disaster responses for the systems' areas. If not yet involved, military liaison officers with the Department of State and the National Oceanic and Atmospheric Administration (including other government systems linked to NOAA) should consider contributing in the development of the global early warning system and also follow its developments to assure best cooperation in case of necessity.

Sources:

Tsunami early warning system for the Mediterranean and Northeast Atlantic launched in Rome
http://portal.unesco.org/en/ev.php-URL_ID=30917&URL_DO=DO_TOPIC&URL_SECTION=201.html

UN tsunami early warning systems extended to Mediterranean, Northeast Atlantic
<http://www.un.org/apps/news/story.asp?NewsID=16657&Cr=tsunami&Cr1=>

4.8 Space Technology to Help Enforce Environmental Regulations

Space observations have become a major tool for monitoring environmental change, helping policy making, developing adequate strategies, and assisting enforcing environment-related regulations. The European Space Agency (ESA) is participating in the climate change summit in Montreal, to share results from satellite-based forest mapping services developed to support the Kyoto Protocol. Another ESA project, Globwetland, supports the Ramsar Convention on Wetlands by developing a global wetland information service using satellites. ESA's project called CONTRAILS is a satellite-based service to monitor daily contrail and cirrus cloud generation by airplanes over Europe and the North Atlantic for a detailed assessment of the greenhouse impact of aviation-induced contrails. The project results are expected at the beginning of 2006. ESA and the EC Joint Research Centre (JRC) signed an agreement of cooperation for using Earth Observation

data in support of the information services of the EU. This will enhance the policy support role of the Global Monitoring for Environment and Security system. [See also *Climate Change—Improved Satellite Climate Change Monitoring* in June 2005 and other related items on the same issue in previous environmental security reports.]

Military Implications:

[Similar to previous on related issues] By improving climate change monitoring, the new satellite capabilities and projects could also increase GEOSS's (Global Earth Observing System of Systems) potential to help enforce international treaties worldwide, calling for more attention to compliance with the international legal requirements. These improvements could also enhance international assessments of human conflict environmental impacts.

Sources:

ESA participating in UN's Montreal summit working for a better atmosphere

http://www.esa.int/esaEO/SEML8FULWFE_environment_0.html

Satellites support Kyoto Protocol through forest mapping service

http://www.esa.int/esaEO/SEMV5V638FE_environment_0.html

Space service for wetlands protection on show at Ramsar COP

http://www.esa.int/esaEO/SEMNUJJBWFE_environment_0.html

Implementing European Space Policy: Key ESA/EC agreement on Earth Observation data signed today

http://www.esa.int/esaEO/SEMOGW538FE_index_0.html

Earth from Space: Contrails over the United States

http://www.esa.int/esaEO/SEM8GGULWFE_index_0.html

4.9 Bird Flu Updates

Although much is going on worldwide on this issue, the following are some noteworthy activities and updates on avian flu: The Convention on Migratory Species (CMS) and UNEP are developing a bird flu early warning system based on mapping the different migratory birds' itineraries and timing. This would alert countries and communities and would provide advice on potential hot spot areas, increasing the possibility of preparedness and strategy development.

The number of H5N1 human infections is rising in Asia, and the disease seems to be spreading in animals in Asia. It has also been identified in parts of Europe and North America. World health officials from more than 100 nations met November 7-9 at WHO headquarters in Geneva, to design a concrete global action plan to counter the threat of a possible avian influenza pandemic among humans. The plan outlines a six-point global action plan for countering any eventual pandemic: improved control at source; rapid detection and response; rapid containment; building and strengthening national pandemic preparedness and response plans; integrated cross-sector country plans for coordinated technical and financial support; and factual and transparent communication.

Strategies for combating the avian flu were also on the agenda of the G-7 and WHO meeting on global health risks and threats of WMD, held in Rome.

The seven member countries of the South Asian Association for Regional Cooperation agreed to create two regional centers to detect and respond to natural disasters and emerging health threats

such as bird flu. A regional center for disaster preparation, emergency relief, and rehabilitation will be set up in India and the disease surveillance center will be in Bangladesh. Member countries will also develop a regional strategy for facing infectious diseases.

While these meetings and strategies are focusing mainly on human health, veterinarian and environmental scientists, emphasizing the interconnectedness between the nature of animal and human health, are advocating that maintaining healthy ecosystems is the best and most important strategy of defense against pathogens. [See also *Avian Flu Update* in October 2005 and other related items on the same issue in previous environmental security reports.]

See items 3.1 *New On-the-spot Test For Influenza* and 3.3 *Chinese Might have Found Possible Cure for Bird Flu* above for potential detection and cure.

Military Implications

[Same as in previous reports on the same issue] The military should continue to coordinate with the networks of WHO and CDC country representatives and their local information collection system and help strengthen these networks to become more globally integrated with the use of pattern recognition and analytic software.

Sources:

Bird flu: UN-sponsored conference draws up six-point action plan
<http://www.un.org/apps/news/story.asp?NewsID=16500&Cr=bird&Cr1=flu>

G-7 and WHO Meet to Discuss WMD, Avian Flu Threats
http://www.nti.org/d_newswire/issues/2005_11_18.html#D55B4003

South Asia to set up disease and disaster centres
<http://www.scidev.net/News/index.cfm?fuseaction=readNews&itemid=2480&language=1>

Pandemics Signal the Urgency of Achieving One Health
<http://app.e2ma.net/app/view:CampaignPublic/id:263.156624355/rid:a7eb241b8ab0d130184acf8736e4445b>

New Avian Flu Early Warning System Based on Migratory Bird Maps
<http://www.ens-newswire.com/ens/nov2005/2005-11-21-01.asp>

4.10 GM Food Protein Revealed to Cause Allergic Lung Damage in Mice

A study in Australia has revealed that subtle structural changes may occur when genetic modification is used to transfer a protein from one species to another. An anti-pest pea protein, coded for by a gene introduced from a bean, caused unexpected immune effects in mice. It turns out that when the transferred gene is expressed in the new organism, slight modifications may occur in the resultant protein, which is then different enough to trigger an immune response. Mice who ate the pea seed and then were exposed to the new protein developed skin reactions and mild lung tissue damage not seen on exposure to the original bean form of the chemical. [See also *GMOs Controversy Continues* in July 2005 and other related items on the same issue in previous environmental security reports.]

Military Implications:

These new results on possible hazards from consumption of GM food could result in more stringent controls on its production and use. The military should review its use of such products and ensure that it is prepared to deal with potential new international regulations concerning them.

Source:

GM pea protein causes allergic damage in mice
<http://www.newscientist.com/article.ns?id=dn8347>

Item 5. Reports to Review**5.1 Underwater Sounds from Human Sources Endangering Marine Life**

A new report by the Natural Resources Defense Council (NRDC), *Sounding the Depths II: The Rising Toll of Sonar, Shipping and Industrial Ocean Noise on Marine Life*, is a comprehensive overview of the scientific record on the impact of man-made underwater noise on marine life. It shows that increasing human marine activity—industrial, commercial, and military—became life threatening to whales, dolphins, fish, and other marine species. The report reviews worldwide incidents of mass whale strandings related to military activities, and the oil and gas industry; maps the "hotspots" affected by different human activities; presents the latest scientific findings on noise and whale strandings; and suggests several measures for reducing the impacts of human-made ocean noise. The recommendations include geographic and seasonal restrictions on intense noise from military sonar and seismic air guns; better monitoring and marine life research; stronger international regulations and enforcement concerning marine life protection; and technological improvements to reduce sonic damage.

Another report, produced by the Convention on Migratory Species and UNEP's Regional Seas Programme, estimates that noise pollution linked with underwater sonar and military maneuvers is putting at risk over 4% of marine species. [See also *Coalition Urges UN to Consider Legislation to Curb Harmful Ocean Sounds* in June 2005, *Scientific Models Could Help Navy Avoid Whales During Sonar Tests* in February 2005, *European Parliament Resolution to Protect Whales From Sonar* in October 2004, and *Research Confirms Military and Industry Sonar Harms Whales* of July 2004 environmental security reports.]

Military Implications:

Relevant military personnel should study the report for its possible impact on new regulations and also for suggestions on how to reduce harm from military marine activity. The Low Frequency Active (LFA) sonar has been banned in 75% of the world's oceans since 2003. It is likely that under the compelling evidence that marine mammals are threatened by increasingly intense underwater noise from human activities, efforts will increase to internationally regulate any-intensity sonar and underwater explosions that might be harmful. This might affect the U.S. Navy plans to site an Undersea Warfare Training Range off Florida, Virginia, or North Carolina.

Sources:

Sounding the Depths II. The Rising Toll of Sonar, Shipping and Industrial Ocean Noise on Marine Life
<http://www.nrdc.org/wildlife/marine/sound/contents.asp>

Fishing Nets Major Risk for Small Cetaceans
<http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=457&ArticleID=5044&l=en>

5.2 Climate Change Impact on Human Health

Climate Change Futures: Health, Ecological and Economic Dimensions (CCF), a three-year study by the Climate Change Futures Project at Harvard Medical School's Centre for Health and the Global Environment, is a comprehensive analysis of trends and implications of global warming in several areas: economy (financial, and impact on developing nations), environment (including exacerbating freaky weather); health (spreading and intensifying diseases); and two potential scenarios to outline possible impacts of climate change. The novelty of this study is the analysis of the direct impact of climate change on human health in addition to environmental and economic impacts that are the focus of most other studies. The report concludes that global warming threatens humans and ecosystems alike, particularly if the frequency of extreme weather events increases. It also offers some recommendations of policies and measures for reducing greenhouse gas emissions, and improving the strategies of adaptation and mitigation of climate change effects.

Military Implications:

[Same as climate change item] The incredible amount of research providing compelling evidence of the effects of greenhouse gas emissions on climate change, as well as the increased number and quality of tools providing information for policy making, will definitely boost action to curb current polluting trends. The military and its contractors should be prepared to anticipate and accommodate the necessary changes.

Source:

Climate Change Futures: Health, Ecological and Economic Dimensions
<http://www.climatechangefutures.org/report/index.html>

5.3 Recent Reports on Energy Issues

5.3.1 Renewables 2005: Global Status Report

Renewables 2005: Global Status Report published by Worldwatch Institute, is a comprehensive overview of today's global renewable energy status and provides trends and estimations, as well as a look at emerging renewable energy technologies and policies. According to the report, government support for renewable energy is growing rapidly, with at least 48 countries (including 14 developing ones) already having some type of renewable energy promotion policy.

Military Implications:

Relevant military personnel should consider the report for insights on potential new regulations concerning renewables in some host countries or regions around the world, as well as for possible insights to improve its own energy-efficiency strategies.

Source:

Renewable Energy Markets Show Strong Growth - REN21 Releases "Renewables 2005: Global Status Report"
<http://www.worldwatch.org/press/news/2005/11/06/>

5.3.2 Target 2020: Policies and measures to reduce greenhouse gas emissions in the EU

Target 2020, a new report by the Wuppertal Institute in Germany, outlines concrete steps that would allow the EU to cut its greenhouse gas emissions to a third of their 1990 level, by 2020. The recommendations include adoption of comprehensive climate policy strategies at regional and national levels, consisting of mandatory regulations promoting energy efficiency and renewables.

To illustrate the analysis, the report compares two scenarios over the period 1990–2020: The “Business-as-usual” scenario—to be avoided, and the recommended “The Policies and Measures (Target 2020)” scenario, which implies high energy-efficiency strategies and policies.

Military Implications:

It is likely that recommendations from this “roadmap for a climate-friendly Europe” might find their way into some technical, political, and economic regulations. Relevant military personnel should consider the report both from point of view of preparedness for potential new regulations and of possible insights to improve military energy-efficiency strategies.

Source:

Target 2020: Policies & Measures to reduce Greenhouse gas emissions in the EU
http://www.panda.org/news_facts/publications/index.cfm?uNewsID=24155

5.3.3 World Energy Outlook 2005 -- Middle East and North Africa Insights

The *World Energy Outlook* is accepted as the most comprehensive source of statistics, projections, and analysis in the energy sector. If energy trends follow the business as usual policy, Middle Eastern and North African oil and gas resources seem critical for meeting the world's future energy needs. This year's *World Energy Outlook* focuses on whether the energy production from these key regions will be able to satisfy global demand over the next 25 years. It assesses energy demand and supply trends for the entire regions; analyzes the implications of these trends for global energy markets, international oil and gas prices and energy security; presents a "Deferred Investment Scenario" and its consequences; and reviews the region's power and water desalination sectors.

Military Implications:

Relevant military personnel should consider the *World Energy Outlook* as a source of information for security issues analysis, and for formulation of future energy-related policies and strategies.

Source:

World Energy Outlook 2005 -- Middle East and North Africa Insights
<http://www.iea.org/bookshop/add.aspx?id=200> (for purchase)

APPENDIX

Reference Details

This Appendix contains the full text for the articles that are not available on the Internet or are usually stored for a limited time on the respective Web sites.

Item 1. Human Security Proposed as Reorganizing Principle for the UN

Former foreign minister wants to “re-wire” UN

By Fabian Schweyher, The Budapest Times, November 21, 2005

<http://www.budapesttimes.hu/index.php?art=1286> (article available for a limited time on the website)

Conflicts and disasters have such international significance for all countries that states should work together to address the effects for the benefit of all of humanity, a former Canadian foreign minister said in a lecture sponsored by the Regional Delegation of the International Committee of the Red Cross and the Canadian Embassy.

“After the fall of the Berlin Wall the world began to build networks for a common response, but these efforts were destroyed by the US’s aggressive and go-it-alone stance in the aftermath of 9/11,” the Nobel Peace Prize nominee Lloyd Axworthy, said last Thursday in Budapest. “Disasters like the recent hurricanes served as a shock treatment to the world in overturning the trap of obsessive pre-occupation with counter terrorism and recognising the need to rediscover the true meaning of security - the idea of human security.”

Axworthy said that the world needs a cohesive rapid response system that pools together donated funds and is on the ground in hours. “We need to reassess the tendency to view foreign aid as an economic consideration to one of human security. An international rapid response funded by member states would fit well under the governance of the United Nations,” he said.

Furthermore, the world has the responsibility to protect, said Axworthy, using the conflict in Kosovo as an example. “If a state legitimately protects its citizens then it is in full right of its sovereign power. If it fails to do so, then the international community must assume this function,” he said.

Re-organisation

This responsibility could become a template for re-organising the global system around a principle that can apply to a wide variety of global issues and set in motion the re-invention of global governance, Axworthy said. He mentioned a Canadian initiative for setting up “white” and “green” helmets to assist in the economic, social and environmental security issues beside “blue” helmets to provide physical security.

“We have a blueprint that could well provide the forthcoming assembly session with a framework in which to re-wire the UN system to make it an effective instrument for responding to the contemporary risks of civil conflict and global calamity,” he said.

Item 3 Technological Breakthroughs with Environmental Security Implications

3.1 New On-the-spot Test for Avian Flu and Other Influenza Strains

New "chip" could provide quick bird flu test

Mon Nov 7, 2005 05:42 PM ET

By Maggie Fox, Health and Science Correspondent

<http://go.reuters.com/newsArticle.jhtml?type=technologyNews&storyID=10190863&src=rss/technologyNews> (article available for a limited time on the website)

WASHINGTON (Reuters) - A new "chip" can test for 11 different influenza strains, including avian flu, in less than a quarter of the time it now takes to diagnose flu in patients, U.S. researchers said on Monday.

The test devised at the University of Colorado is still being validated, but the researchers hope to develop it into an on-the-spot test for influenza.

"If we could put this technology in every doctor's office that would be fantastic," said Kathy Rowlen, a chemistry and biochemistry professor at the university who helped direct the research.

"The current gold standard for doing strain analysis takes about three to four days. That is going to be way too long if we get a highly virulent form of avian influenza that becomes human-adapted."

There are quick tests for influenza, but they only tell if a patient has it or not and do not differentiate among strains. The flu virus mutates constantly and several different strains can be circulating at any time.

Influenza kills anywhere between 250,000 and 500,000 people globally each year, but health experts expect a pandemic could emerge that would kill many more.

The main threat now is the virulent H5N1 avian flu virus infecting chickens in parts of Asia and Europe. It has so far infected 123 people and killed half of them. But it could mutate into a form that passes easily from person to person.

Rowlen's lab began working to help researchers track the strains of flu in circulation. But a quick diagnostic has become imperative as fears have grown over an H5N1 pandemic.

Samples from suspected human cases of H5N1 are now sent to central laboratories for confirmation, but that takes days. Doctors need to know sooner so they can give patients antiviral drugs within 48 hours to lessen the severity of the illness.

Health officials also need to know rapidly so they can track anyone who may have been infected by the patient.

"This new technology should help provide better global influenza surveillance by making it easier for more laboratories to swiftly identify severe flu strains, which in turn may aid health officials to stem potential flu epidemics and even pandemics," said Rowlen.

The chip, which can be configured to test for any flu strain, has been tested by the Centers for Disease Control and Prevention and was more than 90 percent accurate in identifying H5N1 flu samples, the university said in a statement.

Right now it is not easy to use. "We have to take a patient's sample and process it in a rather complicated way," Rowlen said in a telephone interview. But her team is working to make the process simpler and more portable.

"We can make it small and simple enough to take into rural areas in places like the Congo, Cambodia or Indonesia that may lack lab facilities," Rowlen said.

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Item 4. Updates on Previously Identified Issues

4.3 REACH Draft Voted by the European Parliament

No thanks, we're European

Regulating chemicals

Nov 24th 2005 | FRANKFURT

From The Economist print edition

A piece of European legislation that will affect industry across the world

http://www.economist.com/research/articlesBySubject/PrinterFriendly.cfm?Story_ID=5218539&subjectID=348924

MOLLIE the toxic child was in Strasbourg last week as part of a campaign to stiffen European rules on the import and production of hazardous chemicals. A study by the WWF last year found 35 toxic chemicals in Mollie's blood, and similar levels in 13 families tested in 12 European countries. She was in Strasbourg to persuade members of the European parliament to vote green. That is the emotive side of a gigantic clash between industrial interests and proposed European Union legislation designed to minimise citizens' exposure to hazardous chemicals—in their cars, homes, work and playgrounds.

The plan is to subject up to 30,000 substances to a procedure known as REACH (registration, evaluation and authorisation of chemicals). The European Commission produced a proposal in 2003, since when industrial, consumer and environmental groups have been lobbying hard. A

consultation in 2003 led to 968 written responses, of which 587 alone came from Germany, the home of thousands of small companies that handle complex materials. All companies involved in mining, processing, manufacturing or assembly inside Europe, or with the European market in mind, could be affected by REACH.

For that reason, lobbyists have included mining and processing interests in Australia, Canada, Chile and sub-Saharan Africa, to name just the most vocal. American business associations have also complained that the EU proposal cuts across broader plans by the OECD and the World Trade Organisation. Small businesses worldwide may be shut out of Europe by the cost of compliance, many fear. An EU estimate of the cost to industry of abiding by the new regulations ranges from €2.6 billion (\$3.1 billion) to €5.2 billion over 11 years. But the EU sees savings on the other side of the ledger—by limiting exposure to hazardous materials, it foresees savings in health-care costs of as much as €50 billion over the next 30 years. Even giant chemical companies agree that it would be useful to know more about the chemicals people are exposed to. Of the 30,000 substances identified by REACH, only about 10% have been studied in any detail, says the WWF.

But while most people can accept the need for some legislation, they disagree on precisely what it should say. There have been bitter disagreements, even within the EU bureaucracy. The original REACH proposal was drafted by the commission's environment directorate, which was strongly influenced by the likes of WWF. But the enterprise and industry directorate—led by Günter Verheugen, the German vice-president of the commission—has been fighting for the interests of industrialists. The draft REACH regulation, which European parliamentarians voted for by 407 to 155 on November 17th, contained more than 1,000 proposed amendments, of which fewer than 300 survived.

The result pleased neither industrialists, nor greens. Consumer groups complained that REACH's original concept had been watered down—for example by waiving the registration of any substance imported in quantities of less than one tonne a year. Moreover, many other substances would require no more than registration. The priority for screening potentially hazardous substances would be set by volume rather than by other measures of risk—which was the original plan.

The chemical industry was disappointed too, by a rule that hazardous substances will be authorised for at most five years, after which business must find a substitute, unless it can establish some “socio-economic justification”. Five years is too short argues Utz Tillmann, who works on environmental issues at BASF, Europe's biggest chemical company. It took BASF ten years to persuade the car industry to favour a plastic fuel tank over one made of steel, he recalls.

Handlers of non-ferrous metals on the other hand were pleased that ores and concentrates escape the new rules. So do oil-based plastics—because they would have overwhelmed a new European Chemicals Agency due to be set up in Helsinki to handle REACH. Metals traders are forming consortia to standardise the treatment of metals held in warehouses the world over for delivery against futures contracts—fearing that a two-tier market might otherwise develop, one inside the EU and one outside.

At every turn, REACH threatens to trigger unintended consequences. Sandra Carey, of the British non-ferrous-metal lobby, sees it as the EU's most important legislation ever. Her greatest concern is that an over-extended REACH would raise barriers around Europe and suck raw materials and manufacturing in the direction of India and China.

Nevertheless, the EU Council of Ministers, which will be chaired by Britain until December 31st, seems determined to secure a final agreement on REACH by the end of the year. The British are generally wary of burdening industry, but are keen to add some shine to an otherwise lacklustre six-month presidency. Germany won some breathing space this month to give its new government time to review the draft. But EU ministers are due to meet on December 19th and will either accept the parliament's amendments or challenge them and send the bill back for a second reading. The lobbying goes on.

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4.4 Global Environmentally Sound E-waste Disposal System is Needed

Poor Nations Are Littered With Old PC's, Report Says

By Laurie J. Flynn, October 24, 2005

<http://www.nytimes.com/2005/10/24/technology/24junk.html?pagewanted=print> (by subscription only)

Much of the used computer equipment sent from the United States to developing countries for use in homes, schools and businesses is often neither usable nor repairable, creating enormous environmental problems in some of the world's poorest places, according to a report to be issued today by an environmental organization.

The report, titled "The Digital Dump: Exporting Reuse and Abuse to Africa," says that the unusable equipment is being donated or sold to developing nations by recycling businesses in the United States as a way to dodge the expense of having to recycle it properly. While the report, written by the Basel Action Network, based in Seattle, focuses on Nigeria, in western Africa, it says the situation is similar throughout much of the developing world.

"Too often, justifications of 'building bridges over the digital divide' are used as excuses to obscure and ignore the fact that these bridges double as toxic waste pipelines," says the report. As a result, Nigeria and other developing nations are carrying a disproportionate burden of the world's toxic waste from technology products, according to Jim Puckett, coordinator of the group.

According to the National Safety Council, more than 63 million computers in the United States will become obsolete in 2005. An average computer monitor can contain as much as eight pounds of lead, along with plastics laden with flame retardants and cadmium, all of which can be harmful to the environment and to humans.

In 2002, the Basel Action Network was co-author of a report that said 50 percent to 80 percent of electronics waste collected for recycling in the United States was being disassembled and recycled under largely unregulated, unhealthy conditions in China, India, Pakistan and other developing countries. The new report contends that Americans may be lulled into thinking their old computers are being put to good use.

At the Nigerian port of Lagos, the new report says, an estimated 500 containers of used electronic equipment enter the country each month, each one carrying about 800 computers, for a total of about 400,000 used computers a month. The majority of the equipment arriving in Lagos, the report says, is unusable and neither economically repairable or resalable. "Nigerians are telling us they are getting as much as 75 percent junk that is not repairable," Mr. Puckett said. He said that Nigeria, like most developing countries, could only accommodate functioning used equipment. The environmental group visited Lagos, where it found that despite growing technology industries, the country lacked an infrastructure for electronics recycling. This means that the imported equipment often ends up in landfills, where toxins in the equipment can pollute the groundwater and create unhealthy conditions.

Mr. Puckett said the group had identified 30 recyclers in the United States who had agreed not to export electronic waste to developing countries. "We are trying to get it to be common practice that you have to test what you send and label it," he said.

Mr. Puckett also said his group was trying to enforce the Basel Convention, a United Nations treaty intended to limit the trade of hazardous waste. The United States is the only developed country that has not ratified the treaty.

Much of the equipment being shipped to Africa and other developing areas is from recyclers in the United States, who typically get the used equipment free from businesses, government agencies and communities and ship it abroad for repair, sale or to be dismantled using low-cost labor.

Scrap Computers, a recycler in Phoenix, has eight warehouses across the United States to store collected electronics before they are shipped to foreign destinations, and Graham Wollaston, the company's president, says he is opening new warehouses at the rate of one a month. Mr.

Wollaston, who describes his company as a "giant sorting operation," said there was a reuse for virtually every component of old electronic devices: old televisions are turned into fish tanks for Malaysia, and a silicon glass shortage has created huge demand for old monitors, which are turned into new ones. "There's no such thing as a third-world landfill," Mr. Wollaston said. "If you were to put an old computer on the street, it would be taken apart for the parts."

Mr. Wollaston said the system was largely working, though he conceded that some recyclers dump useless equipment in various developing nations, most notably China. "One of the problems the industry faces is a lack of certification as to where it's all going," he said. He says his company tests all equipment destined for developing nations.

The Environmental Protection Agency concedes that "inappropriate practices" have occurred in the industry, but said it did not think the problem should be addressed by stopping all exports.

"E.P.A. has been working with the Organization for Economic Cooperation and Development countries for the last several years on development of a program that would provide much greater assurance that exports of recyclable materials will be environmentally sound," Tom Dunne, of the agency's Office of Solid Waste and Emergency Response, wrote in an e-mail message.

4.5 Sunk Weapons Represent a Growing Health and Environmental Hazard

U.S. not legally bound to reveal dump sites

Monday, October 31 2005 @ 11:12 AM PST

Contributed by: arch_Stanton, Welcome to Infoshop News

Earth FirstAs World War II drew to a close, the U.S. Army was faced with scant storage space in ordnance depots at home and massive chemical weapons stockpiles overseas.

The solution: Dump the weapons off the coast of whatever country they were in.

U.S. not legally bound to reveal dump sites

Activists want government pressured to tell truth about deadly chemicals at sea.

By John Bull
Special to The Morning Call

Editor's note: For decades, the U.S. Army secretly dumped millions of pounds of chemical weapons off the coasts of America and other nations throughout the world. Today, in the second day of a two-part series, we examine the extent — and the potential environmental disaster — of the dumping that occurred worldwide.

As World War II drew to a close, the U.S. Army was faced with scant storage space in ordnance depots at home and massive chemical weapons stockpiles overseas.

The solution: Dump the weapons off the coast of whatever country they were in.

The result: U.S.-made weapons of mass destruction litter the coasts of more than 10 countries including Italy, France, India, Australia, the Philippines, Pakistan, Japan, Denmark and Norway, and the French territory of New Caledonia, according to a 2001 Army report recently released to the Daily Press of Newport News, Va.

The chemical weapons remain there to this day. They are extremely dangerous.

Some of them have washed up on shore or have been dredged up by fishermen. At least 200 people have been seriously injured over the years.

The Army now admits it secretly dumped at least 64 million pounds of chemical warfare agents as well as more than 400,000 mustard gas-filled bombs and rockets off the U.S. coastline, and much more than that off the coasts of other countries, a Daily Press investigation has found.

The Army can't say where all the dump sites are. There may be more.

The Army is missing years of records on where it secretly dumped surplus chemical weapons from the close of World War II until 1970, when the practice was halted. It has not reviewed records of post-World War I at-sea chemical weapons dumping, but knows the practice was commonplace at the time.

In addition to at least 26 dump sites off the American coast, more than 30 U.S.-created chemical weapons dump sites are scattered throughout the world's oceans off the coasts of other countries, according to the newly released Army report. The report was created by the chemical weapon historical research and response team at the Aberdeen Proving Ground in Maryland.

"It's a disaster looming, a time bomb, say," said Gert Harigel, a physicist in Geneva, Switzerland, who has been active in international chemical weapons issues. "The scientific community knows very little about it. It scares me a lot."

The United States is not legally bound to do anything about the dangers it created in the world's oceans, whether from its own weapons it dumped or those of captured enemy stockpiles.

A 1975 treaty signed by the United States prohibits ocean dumping of chemical munitions. But it does not address dump zones created before the treaty was signed.

And the overseas chemical dump sites are presumed to be in international waters, inoculating the U.S. government from legal responsibility, said Peter Kaiser, spokesman for the Organization for the Prohibition of Chemical Weapons at The Hague in the Netherlands.

"Legally, nothing can be done," said Harigel, a member of the Geneva International Peace Research Institute. "But from a humanitarian point of view, they need to be pressured to do something."

At the least, Harigel said, the U.S. government should monitor the chemical dump sites it created and spread warnings if environmental evidence shows they are leaking.

Other nations with dump sites

In recent years, the Army quietly has gone through decades-old classified records and identified five other countries where U.S. chemical-laden bombs, rockets and grenades were thrown into the sea. The names of those countries remain classified, but records at the National Archives provide hints.

The Daily Press uncovered an Aug. 24, 1944, memo classified at the time as "restricted" that revealed in which other allied countries the United States kept stockpiles of chemical weapons during World War II.

Those countries include New Zealand, China, the former Soviet Union and unidentified "Latin American countries." The United States used parts of Panama as chemical weapons bombing ranges for years. Other National Archives records detail two shipments of unidentified chemical weapons, totaling 20,000 pounds, in 1953 and 1954 from the United States to Fort Amador in Panama.

The Army says it informed the governments of those five unidentified countries in recent years of the dangers lurking off their coasts, but was asked by those governments not to release the information to the public.

Two summers ago, researchers for the New Zealand government searched U.S. government records at the National Archives, seeking information on chemical weapons ocean dump sites, said archivist Tim Nenninger.

Harigel said residents of those unidentified countries should be told by someone, either their governments or the U.S. Army, of the potential dangers.

"Whether or not anything can be done at this point, the people there deserve to know," he said. "The danger increases with time. The shells are more and more corroding. The fishermen can easily get this stuff into their nets and get seriously hurt."

Scientists have determined the mustard agent damages DNA, causes cancer and survives for at least five years on the ocean floor in a concentrated gel. Nerve gas lasts at least six weeks when it is released into seawater, killing every organism it touches before breaking down into nonlethal component chemicals.

Chemical-filled munitions now on sea beds are slowly leaking, and more surely will as years pass, depending on the depth of the water, the thickness of the containers and water temperature, according to a 2004 study by Jiri Matousek, a Czech scientist.

The hazard of leaking shells probably will last for "another tens to hundreds of years," he concluded. "It is also without doubt that long-term monitoring at areas of concern is needed as a categorical imperative."

The problem is so bad in the Baltic Sea that Denmark has covered portions of some shallow-water dump sites with concrete to contain leakage.

Other nations not told

The Army has known for decades of its overseas chemical weapons dumps, yet left other governments to discover and deal with the problem on their own.

Japan's problems from U.S. chemical weapons dumping didn't come to light until a government inquiry in 1973, after more than 85 fishermen were injured by chemical warfare agents dumped by either U.S. occupation forces or the Japanese military at the close of World War II.

It wasn't until 2003 that Australia discovered on its own that the U.S. Army had dumped more than 60 million pounds of chemical weapons off Brisbane, and pinpointed precise quantities and nautical coordinates. The Australian government posted the area off-limits to mariners and released a well-publicized report on its findings.

The Canadian Department of National Defence has worked for three years to identify offshore chemical weapons dump sites created by either the U.S. or Canadian military. Three have been found, and the Canadians believe the United States may have created one of them.

The well-publicized Warfare Agent Disposal project began after a Halifax area antiques dealer named Myles Kehoe discovered that the Canadian military had moved some of its post-World War II chemical munitions through Nova Scotia for disposal. When his fisherman father remembered hearing that the ordnance was loaded onto ships and dumped somewhere at sea, alarm bells went off in Kehoe's head.

"He laughed about it," Kehoe said. "They did it all the time, he said." At Kehoe's insistent prodding, the Canadians have identified three chemical weapons dump sites in Canadian waters and are researching roughly 1,200 other underwater locations that their records show may be ordnance dumps.

Stockpile unaccounted for

The Canadian government believes the United States may have jettisoned chemical weapons roughly 100 miles off the coast of Vancouver Island in British Columbia, north of Washington state. The U.S. Army says it has no record that was done, but won't rule it out.

"I won't say there's nothing there that belongs to us," said William Brankowitz, a deputy project manager in the U.S. Army Chemical Materials Agency and a leading authority on the Army's chemical weapons dumping.

The United States had an 18-ton stockpile of chemical weapons in Alaska after World War II, National Archives records reveal. The Army doesn't know where it all went.

The two other chemical weapons dump sites in Canadian waters are off the coast of Sable Island and Nova Scotia, near the Grand Banks, one of the world's best fisheries, with one site spread out over at least 30 nautical miles. It is presumed to have been created by the Canadian government after World War II.

"Fisheries are dying. The sea bottom is going bare. It's terrible," Kehoe said. "We are finding crab mutations that no one can explain. Cod are dying at their larval stage. Most of that stuff is starting to leach now" from their steel containers into the sea.

Kehoe's campaign for information and action has spanned 13 years and is becoming increasingly frantic.

A few years ago, the U.S.-based Hunt Oil Co. was granted a license by the Canadian government to conduct seismic testing for potential petroleum products off the coast of Nova Scotia.

"There is absolutely no scientific documentation on what effect oil exploration has on these dump sites," Kehoe noted. "There is absolutely no research on it. The National Defence Department went public, on air, saying we don't know the impact of seismic testing on these sites.

"This nightmare is going to be happening to you over there. It's horrifying."

170,000 tons to sea bottom

In the most publicized of all chemical weapons dumps, British and U.S. forces loaded dozens of German ships with captured nerve and mustard gas from 1945 to 1947 and sank them in the Skagerrak strait. The wrecks are off the coasts of Sweden, Norway and Denmark, and near the Danish island of Bornholm in the relatively shallow Baltic Sea.

It was called Operation Davy Jones Locker. An estimated 170,000 tons of German chemical weapons went to the bottom. Most, but not all, went into deep water.

Russia also dumped some of its chemical weapons stockpile in the ocean. So did Australia, not far from the Great Barrier Reef. And England dumped much of its stockpile so close to land in the North Sea that chemical ordnance routinely washes up on its shore to this day.

The United States' ocean dumping of chemical weapons stockpiles both at home and overseas made logistical sense at the end of World War II, and no one in those days had much environmental awareness.

At the time, U.S. ordnance depots across the country were packed with war supplies, including a stockpile of 60 million gas masks, National Archive records show.

Room had to be made for chemical weapons still in production but not yet delivered, and there was little space to put overseas stockpiles if they were brought back to the United States.

By early 1945, a blizzard of memos out of the War Department demanded that ordnance depots reduce unnecessary stock by emptying and burying drums of chemical warfare agents and selling nonhazardous material to the public as war surplus, National Archives records show.

War surplus sales were so frenzied that in October 1945 a colonel in the Chemical Weapon Service issued a memo warning that bomb-packing crates must be better inspected before being sold. Buyers, it turned out, had discovered some of the crates still had bombs in them.

Sailors jeopardized en route

Besides having nowhere to put them, chemical weapons were dangerous to transport by ship and jeopardized sailors, the Army discovered. Several shipments back to the United States resulted in leaks.

Leak detection was unsophisticated at the time.

If nerve gas was shipped, crates of rabbits were placed on deck. If the rabbits died, the crew knew there was a serious problem.

Edward Aho, of Astoria, Ore., was on the SS Isaac Wise as it was loaded in spring 1946 with captured German mustard and phosgene gas bombs. During the trip from Antwerp, Belgium, to the former San Jacinto Ordnance Depot in Houston, 16 of the bombs leaked and at least five people were burned, declassified Army records show.

Aho said the only precaution taken before the ship sailed was to build wooden bulkheads against the steel skin of the ship, in the hope the wood would cushion the blow if the ship's movement dislodged the bombs.

Aho, 78, said he was sent into the ship's hold once to look for a leak, protected only by a gas mask and armed only with a primitive gas detection device that looked like a "battery with a gauge on it." "I'll never know if what [nervous system] problems I have [are] related. I'll never know," he said in a phone interview, declining to specify his health problems.

Those leaking bombs were destroyed in Texas. The rest of the bombs were taken by railcar to Pine Bluff Arsenal in Arkansas. During the trip, more of them leaked. What happened to them after that is unclear from the sketchy Army records that still exist.

Hundreds injured

Over the decades, many fishermen overseas have been seriously injured after being exposed to U.S. chemical weapons dumps created after World War II.

"Around the world, accidents have happened," said the Army's Brankowitz. "Fortunately, there has been nothing I would call colossal or catastrophic accidents."

Denmark's government estimates that chemical warfare agents dumped in the sea by either the United States or Britain have hurt 150 mariners and have been discovered washed up on shore. In 1984 alone, 11 Danish fishermen were burned by mustard gas while fishing in the Baltic Sea.

Crews of fishing boats off the Danish island of Bornholm routinely wear chemical protection suits when at sea near a known chemical weapons dump site. Vessels working other areas of the Baltic are required to keep gas masks and special medical kits on board.

The problem is so bad in the relatively shallow Baltic Sea that the seabed is surveyed every summer by Latvia, Russia and Finland to determine whether long-dumped chemical shells are leaking.

At least 52 Japanese were injured in 11 accidents at one of eight known U.S. chemical ocean dumps, mostly of Japan's captured chemical weapons stockpiles. When the Japanese government publicized the locations of those dump areas in the 1970s, the number of injuries dropped.

Disclosure by Australia

In 1983, an Australian fishing trawler snagged a one-ton steel container of mustard agent dumped off the coast of Cape Moreton in Australia by the United States and pulled it to shore, according to a 2003 Australian government report. No one was injured.

The partially filled container was snared in relatively shallow water not far from where the U.S. Army now admits it dumped an estimated 32,000 tons of mustard agent and toxic Lewisite in drums, and in hundreds of thousands of chemical-filled artillery shells.

It was the second time a trawler in that area pulled up a one-ton mustard gas container dumped by the United States. The first was on Jan. 17, 1970. A few years later, a similar, partially filled container washed up on shore. No one was injured in those two incidents.

In 2003, the Australian government created an in-depth report on what it calls chemical warfare agent dumps, identifying exact latitudes and longitudes of U.S.- and Australian-created chemical weapons dumps. The information was released to the public and widely publicized in the news media there.

"The publication of this paper will, hopefully, prevent accidents occurring at the CWA dump sites where coordinates have been revealed," the report concludes. "It will also, hopefully, encourage other governments to reveal locations of their CWA sea dump sites for the same purpose."

That's something the United States has not fully done, and should do out of simple decency to its citizens and residents of other countries where the Army created chemical weapons hazards, said Harigel, of Switzerland.

"The government is not open to the public in the United States," he said. "There should be pressure put on them."