

The Worst of Both Worlds: Poverty and Politics in the Balkans



“**[A]**bove this hem of fertility round the shore olive groves and almond orchards rose in terraces to bluffs naked except for a little scrub, on which rested a plateau with more olives and almonds and a scattered blackness of cypresses and some villages and churches. Above this were the naked peaks, reflecting the noonlight like a mirror.” Thus, writing on the eve of World War II, British author Rebecca West described a scene on the Dalmatian coast in what is now Croatia in the Balkan Peninsula. As West observed, the region is one of the loveliest in Europe, yet the term “Balkan” carries with it a negative connotation—a result of the centuries of conflict that have taken place in the region, which has spent much of its history as a buffer zone

between more powerful neighbors. Today, with the collapse of the communist system, the region appears to have lapsed once more into an unstable political and economic position. The environment of the region suffers the same legacy.

Historically, the countries of the Balkan region obeyed the imperatives to develop heavy industry, factory farming, and militarization, all of which have led to pollution of the region’s air, water, and soil by heavy metals, radioactivity, pesticides, and fertilizers. Yet the benefits of modernization and technological development, such as a higher standard of living and progressive health care, have largely passed the region by. In this sense, the countries of the Balkan region experience the worst of both worlds: they must suffer

the diseases of both industrialization and rural poverty.

What Are the Balkans?

The term “Balkan” is somewhat outdated. International bodies such as the European Union (EU) and the United Nations (UN) now refer to the former Soviet satellite countries as Central and Eastern Europe (CEE). Not all of the CEE countries are in the Balkan region. In this article, the term “Balkans” refers to the CEE countries of Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Hungary, the Former Yugoslav Republic (FYR) of Macedonia, Romania, Slovenia, and the Federal Republic (FR) of Yugoslavia, now consisting primarily of Serbia and Montenegro. (Greece, while part of the Balkan Peninsula, has a very different

recent history and is not considered here.) Within this group of countries there are sharp differences in economic status, social institutions, and environmental health threats. The more northerly countries are relatively well off economically, while the southern states, particularly Albania, lag far behind. This gap has corresponding consequences for environmental health.

Reliable statistics regarding the Balkans are scarce. The little available information is for CEE in general, of which the Balkans are only a part. Therefore, some of the information in this article refers to the whole of CEE and, while the best information available, still may not represent the truest picture of the Balkan situation.

According to data from the World Health Organization (WHO) and the Regional Environmental Center for Central and Eastern Europe (REC), the Balkans are home to about 8% of Europe's population (about 67 million people). Romania has the largest population (22,474,000), while Slovenia has the smallest (1,993,000). The population is growing most rapidly in Albania, where the 1% annual growth rate matches that of the United States. Population rates of Bosnia and Herzegovina, Bulgaria, and Hungary are declining, however. Balkan living standards have never approximated those of Western Europe or the United States, and they have plunged in the last decade. World Bank figures for global gross national products in 1998 rate Slovenia 52nd in the world at \$9,760 per capita. By this measure, Slovenia is the richest Balkan nation. Albania ranks 144th at \$810, while Bosnia and Herzegovina and Yugoslavia are estimated to be between \$761 and \$3,030. By contrast, the United Kingdom is 22nd at \$21,400 and the United States is 10th at \$29,340.

The crumbling of communist governments has sent CEE countries, including the Balkans, into great instability economically and politically, with consequences for an already-damaged environment and for human health. Eleonora Kapitonova, a physician writing in the Spring 1999 issue of the *Global Health and Environment Monitor*, describes a "devastating, decade-long health spiral plaguing Central and Eastern Europe," which she attributes to a reduction in public health funds, shortages of medicine and food, poor working conditions, and the usual consequences of poverty and war.

The environmental health of CEE countries, including the Balkans, is affected by the same factors as that of Western Europe and the United States. Airsheds are significantly degraded by emissions from industry, power-generation facilities, and transportation. Soils and water contain pesticides, fertilizers, industrial chemicals, and microbiological contaminants. The health problems associated with these environmental conditions include respiratory diseases; cancer; birth defects; liver, kidney, and neurological damage; and infectious diseases. While little information is avail-



The Balkans.

able specifically about the Balkan countries' environmental health status, some general indicators suggest part of the story.

Death rates in the Balkans have risen while Western European rates have fallen over the last several decades. According to the WHO's online atlas of leading and avoidable causes of death in CEE (located at <http://www.who.dk/country/country.htm>), in 1970 Bulgaria's crude death rate per thousand was 9.08 compared to the United Kingdom at 11.76. By 1989, Bulgaria's rate had risen to 11.89 while the United Kingdom's had dropped to 11.40. Bulgaria's rate shot up to 14.00 in 1996 as the United Kingdom's dropped to 10.67.

The Legacy of Industry: Dirty Air

Air quality in the Balkans is affected most by industrial emissions. The Balkans are

not homogeneous in terms of industrial development, and in some cases this is a blessing. Albania and Slovenia are not well developed industrially, in part because the terrain does not lend itself to urbanization and industrialization. In addition, many factories throughout the Balkans shut down after the collapse of communism, lowering the levels of pollutants emitted simply by default. However, industrial exposures still abound in much of the region, and little has been done to address the potential and actual health effects. Respiratory health is considered by many experts in the Balkans to be the region's worst environmental health problem primarily because of tobacco consumption and very poor air quality. Although CEE countries contribute relatively little to Europe's total output of sulfur dioxide, nitrous oxide, volatile organic compounds, and carbon dioxide, the people living in CEE are exposed to very high concentrations of these agents, mostly from the combustion of solid fuel in industry and from electricity-generating plants.

The WHO has established air quality guidelines for sulfur dioxide and suspended particulate matter at 125 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) each and for lead at 0.5–1.0 $\mu\text{g}/\text{m}^3$. Concentrations of these substances are much higher in CEE countries than in any other region of Europe, according to *Europe's Environment: The Dobris Assessment*, the first comprehensive report on the state of Europe's environment, published in 1995 by the European Environment Agency (EEA).

Budapest, Hungary, outranks most other European cities for its levels of sulfur dioxide, suspended particulate matter, carbon dioxide, and average annual concentrations of benzo[*a*]pyrene and lead (most gasoline sold in the region is leaded). In Sofia, Bulgaria, sulfur dioxide was measured at 2,200 $\mu\text{g}/\text{m}^3$ in one hour. In 1995, Bulgaria had the highest sulfur dioxide emissions in the world. In Romania, Bucharest's levels are only slightly lower and in Zlatna sulfur dioxide was measured at 3,020 $\mu\text{g}/\text{m}^3$ in one month. According to a February 1994 report by the U.S. Environmental Protection Agency (EPA), *Measuring Air Quality: The Pollutant Standards Index*, sulfur dioxide causes impaired respiratory function and may aggravate existing respiratory disease, especially bronchitis, asthma, and chronic obstructive



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Unchecked industry. Factories such as the Azomures fertilizer factory in Tirgu Mures, Romania, help to create the highest concentrations of certain air contaminants in Europe.

pulmonary disease. It also leads to wheezing, shortness of breath, and coughing, and particulate matter in the air makes the effects more severe. These problems are counteracted to some extent by low numbers of automobiles and by the fact that CEE is the least urbanized of Europe's regions, but these two factors are rapidly reversing. According to the *Dobris Assessment*, "In Central and Eastern European countries, although fewer people have a car, the annual rate of increase in car ownership is greater than in Western Europe."

One of the worst contaminants in the Balkans is lead, which is produced as a by-product of the extraction and processing of such metals as zinc, copper, gold, and silver. While Balkan countries are minor sources of metals and minerals worldwide, many Balkan residents are exposed to very high lead levels. The *Dobris Assessment* estimates that 400,000 children in CEE countries are affected by lead poisoning. According to the EEA's 1999 report *Environment in the European Union at the Turn of the Century*, blood lead concentrations of 10 micrograms per deciliter ($\mu\text{g}/\text{dL}$) or higher in children are cause for concern. According to the Agency for Toxic Substances and Disease Registry (ATSDR), low exposures result in reduced IQ and attention span, reading and learning disabilities, hyperactivity, impaired growth, visual and motor dysfunction, and hearing loss. In adults, a concentration of 25 $\mu\text{g}/\text{dL}$ is considered elevated. According to the ATSDR, high exposures

in adults lead to brain and kidney damage, high blood pressure in middle-aged men, and male fertility problems.

The Romanian town of Zlatna provides a snapshot of the typical environmental scenario for many, if not most, Balkan industrial towns. Zlatna is clustered around the Ampellum S.A. refinery and smelter, which extracts copper and other metals from various ores while releasing arsenic (which can cause nerve, liver, and kidney damage as well as lung cancer), sulfur dioxide, and lead into the environment. In the late 1980s, the Romanian government identified Zlatna as a hot spot of environmental concern and requested help from the U.S. Agency for International Development (USAID) to address the problems.

In 1994, a project funded by USAID and implemented under the Environmental Health Project, for which the consulting firm Camp Dresser & McKee International (CDM) is the prime contractor, sought to reduce children's and workers' exposures to smelter emissions and improve the local environmental protection agency's ability to monitor plant emissions in Zlatna. A separate USAID project was charged with reducing airborne emissions from the plant. In a limited sample, the children's blood lead concentrations were found to be between 20 and 65 $\mu\text{g}/\text{dL}$, far higher than the international guideline of 10–15 $\mu\text{g}/\text{dL}$, according to the project's January 1998 report, *Summary of Activities in Zlatna, Romania, 1994–1997: A Cross-Sectoral Approach to Environmental and*

Occupational Health Improvements. Romanian health researchers had already determined that Zlatna children had higher blood pressure than other children in their county, were 25% smaller, and suffered 30% more musculoskeletal problems. Workers at the smelter had what the USAID/CDM report called "shocking" levels of lead poisoning, and the local population suffered high incidences of tuberculosis, acute and chronic respiratory disease, and bronchial asthma.

Patricia Billig, an environmental health toxicologist with CDM, was a technical director for the Zlatna project. The local people, she says, "were very well educated and . . . committed to trying to do something, especially at the local level." According to her, the people of Zlatna were aware of the risk of lead poisoning for adults working at the smelter and attributed their respiratory problems to such work exposures, but, she says, "they were not aware that lead exposure was a major issue with children." The USAID staff therefore concentrated their efforts on educating Zlatna residents and reducing the children's lead exposure. They worked with parents, kindergarten and other preschool teachers, local doctors, government authorities, and a newly formed nongovernmental organization called EcoZlatna in a project to create effective educational materials for parents and children, reduce lead exposure by replacing the lead-contaminated dirt in the local kindergarten's outdoor play areas, improve kindergarten washing facilities, and train local health professionals in sampling and data analysis techniques for both children and workers. In 1997, the mean blood lead concentrations for Zlatna's children had been reduced by 30%, from 40 to 28 $\mu\text{g}/\text{dL}$, and the percentage of children in the medium risk group was reduced from 50% to 20%.

Results for the town in general and the smelter workers were less rosy. Although the USAID objectives in Zlatna included reducing smelter emissions and CDM provided stack emission monitoring equipment, the smelter was operating in its original condition by the time the project ended in 1997. Project workers had discovered early on that Zlatna residents felt powerless to do anything about the smelter's emissions because the smelter was the town's primary employer. Even the emission monitoring activity was a source of conflict between the regional environmental protection agency and the plant. The USAID/CDM report summarizes the plant's attitude by saying that although the plant had occupational

health and safety staff and a toxicology laboratory, “maintaining worker health and safety was simply not an actual management goal and received little attention.” The smelter’s director of health and safety was a metallurgist whose environmental health training consisted of reading the pertinent regulations.

However, says Billig, the combination of new plant management, a USAID-sponsored occupational health and safety training and mentoring program for plant staff and local regulatory staff, and new equipment for ambient monitoring and personal protection has resulted in major health and safety improvements at the plant, including a significant reduction of blood lead concentrations among workers in high risk areas.

Wasteland

According to *Europe’s Environment: The Second Assessment*, the EEA’s 1998 follow-up to the *Dobris Assessment*, “Waste management in most Balkan countries continues to be dominated by the cheapest available option: landfills.” The *Dobris Assessment* had already looked at how untreated landfills leach heavy metals, polychlorinated biphenyls, and other toxic substances into groundwater, and contribute quantities of methane to the atmosphere. Industrial wastes add similar substances to air, groundwater, and soil in the form of salts, sludges, slags, suspended particulate matter, and gases. According to the *Dobris Assessment*, in Hungary as late as 1995, more than 75% of municipal waste went to landfills with less

than 10% being composted and none at all being recycled.

The Balkans have made little progress with wastes partly because waste legislation is “poorly developed,” according to the *Second Assessment*. In Bosnia and Herzegovina, the 1992–1995 war devastated the country’s already minimal waste disposal infrastructure, says Nesad Seremet of the Bosnia and Herzegovina REC office. There is now only one operating municipal wastewater treatment plant in the country. Nor is there a comprehensive inventory of hazardous wastes, he adds, but during the war “the country had accumulated tons of humanitarian aid in pharmaceuticals [that were] way past their expiration dates and thus [were] waste materials for which there were no adequate disposal facilities.”

The Balkans have often been a convenient dumping ground for other countries’ wastes. For example, in 1991 Albania received so-called humanitarian aid from Germany through the auspices of the EU and the World Bank in the form of about 500 metric tons of pesticides, including toxaphene, an insecticide containing more than 670 chemicals that can damage the nervous system, liver, kidneys, and lungs, as well as cause birth defects. In high doses it can be fatal. Most of the products had been manufactured in the former East Germany and were close to or past expiration. Greenpeace, which was tracking the shipment, announced in 1994 that most of the chemicals were still warehoused in Albania but that some had reached three

Albanian towns, where people had been seen using the chemical containers to hold drinking water. After an Albanian television producer and environmental activist produced a film on the situation called *Train of Death* and Greenpeace drove a symbolic amount of the pesticides through Europe to emphasize the problem, the German government took back 450 metric tons of the pesticides, according to the Winter 1994 issue of the REC publication *The Bulletin*.

Hazardous waste is another problem in the region. According to the *Dobris Assessment*, hazardous waste (including industrial and medical waste) is virtually unmonitored in CEE. Tighter regulation in Western Europe has encouraged many countries to export their hazardous waste to less stringent countries. More than two million tons of waste crosses national borders each year, and the movement is mainly from Western Europe to CEE.

Public Health

Public health infrastructures in the Balkans were fairly strong during the communist era but have declined in the last 15 years. Figures from the WHO Health for All (HFA) database indicate that most countries formerly had high rates of childhood immunization, access to indoor water and plumbing, and regular waste collection. But in the postcommunist period, living standards have declined and many public services have ceased functioning. According to the 1 June 1998 *Financial Times*, cholera, polio, and hepatitis outbreaks have occurred in Albania and Bulgaria in the last three years. Drug-resistant tuberculosis poses a grave threat, and rates of the disease are rising. According to HFA, the CEE average for tuberculosis increased from 49.25 per 100,000 people in 1985 to 52.77 in 1985. In Romania the figure jumped from 55.78 to 102.60 in the same decade.

According to the *Dobris Assessment*, there are many contaminants in European water, including the microbes that cause hepatitis, shigellosis, cholera, and meningitis (especially in FR Yugoslavia and Romania), as well as chemicals such as nitrates (Hungary), lead, arsenic (Bulgaria, Hungary, and Romania), and fluoride. The report adds that “most of the hazardous chemicals are effectively regulated and controlled, and the exposure to chemicals in drinking water seems, generally, to have less health impact on the total population of Europe than does the microbiological contamination.”

The 1997 United Nations Environment Programme report *Global Environmental Outlook-1* states that about



Dangerous fun. Adults swim in the Tarnava Mare River, where fecal coliform bacteria counts often exceed safe limits due to animal farming and improper garbage disposal upstream.



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Taxing the system. Most sewage treatment plants in Romania, such as this one in Sighisoara, are either not working, working improperly, or operating beyond their designed capacity.

70% of the water west of the Ural Mountains is taken from surface supplies that cross national borders, such as the Danube. But in FR Yugoslavia the principal source is groundwater, according to a June 1999 REC report titled *Assessment of the Environmental Impact of Military Activities During the Yugoslavia Conflict*. Thus, in the war-torn region the introduction of chemicals into the water supply from bombed factories (adding to the existing chronic pollution) and the human waste seeping into Macedonian groundwater from refugee camps has placed a heavy burden on drinking water supplies.

The WHO has referred to a “tobacco epidemic” in CEE countries. CEE smokers consume about seven cigarettes a week more than the European average. The rate at which men who are currently 35 years old will die from smoking before age 70 is twice as high for CEE as for Western Europe, with those men reducing their life spans by about 21 years.

In the Fall/Winter 1995 issue of the *Central European Health and Environment Monitor*, Richard Peto, a professor of medical statistics at the University of Oxford in the United Kingdom, wrote that “men in Central and Eastern Europe have the highest death rates in the world from tobacco use” as well as the highest lung cancer rate in the world. In 1998, the WHO said that “20% of all [CEE] men aged 35 will die from tobacco-related illness by the age of 69.” In Albania and Bulgaria nearly half the males over age 15 are daily smokers.

As tobacco producers lose markets in Western Europe and North America, they continue to concentrate their efforts in regions such as the Balkans, where regula-

tions are few or poorly enforced. Thus, smoking-related diseases are expected to increase, at least in those countries that do not enter the EU; in 1998 the EU enacted a tobacco advertising law calling for complete bans on tobacco advertising and promotion by 2006.

The *Dobris Assessment* indicates that over the last 20 years the death rates from respiratory diseases were far higher in CEE than in Western Europe, mainly due to high child mortality. Perhaps partly because air pollution fell due to the number of idle industries, the death rate declined in CEE from 1985 to 1995. According to HFA, the European death rate average dropped from 82.07 per 100,000 people in 1985 to 67.54 in 1995. Only Slovenia saw an increase, from 49.87 to 66.95.

Cancer deaths, formerly lower in CEE than in Western Europe, are on the rise, according to HFA. While the European average went from 190.09 deaths per 100,000 people among all ages to 189.96, the CEE average rose from 189.86 to 209.95, with Hungary’s increase being the most dramatic—from 244.68 to 280.93.

In 1990, deaths from tracheal, bronchial, and lung cancer in the Balkans were higher than the European average of 21.21 per 100,000 in people ages 0–64. Only Bulgaria fell below that average at 20.80. Hungary was the highest at 37.85.

The Effects of War

FR Yugoslavia and Albania are currently suffering perhaps the worst environmental problems of the Balkan countries, due in part at least to the recent military conflict in the region. From 24 March to 9 June 1999, NATO conducted a military action against FR Yugoslavia in which Serbia was exten-

sively bombed. Refugees were crowded into camps just across the Kosovo borders in FYR Macedonia and Albania, where humanitarian organizations had to provide them with food, shelter, safe drinking water, and waste disposal. According to an article in the Autumn 1999 issue of *Refugees* magazine, which is published by the United Nations High Commissioner for Refugees, 444,600 ethnic Albanian refugees fled to Albania, 244,500 to FYR Macedonia, and 69,900 to Montenegro. The effect of this situation was to compound the area’s existing health challenges of poor air quality, industrial contamination, decaying infrastructure, and high tobacco use.

The environmental health impacts of the bombing are still being debated. The Serbian government, the United Nations Environment Programme’s Balkans Task Force (BTF), and the REC all released initial reports that disagreed as to the extent of the damage. A comprehensive BTF report titled *The Kosovo Conflict: Consequences for the Environment of Human Settlements* was released in October 1999.

Potential threats to human health resulting from the war include exposure to depleted uranium (DU) bombs, encounters with unexploded cluster bombs and land mines, exposures to toxic chemicals released at bombed industrial sites, and lack of potable water and sanitation facilities. Norm Gregory, a professor of nursing at Shoreline Community College in Shoreline, Washington, worked in the Albanian refugee camps and on trains carrying refugees to Albania as part of a project with Northwest Medical Teams International, a Portland, Oregon-based nongovernmental organization that provides humanitarian medical assistance at crisis points around the world. According to Gregory, international agencies working in the camps were very well coordinated in disease prevention, and early fears of typhus and cholera sweeping through the refugee population were not realized.

The refugee camps may have had more effect on the residents of the host countries. The REC *Assessment* said that in most camps sewage was put into “septic holes,” not septic tanks. These holes filtered sewage into the surrounding soil and groundwater. In camps near the Adriatic Sea, according to the report, some *E. coli* was detected in the water supplies, but the report did not indicate any actual outbreaks of disease as a result. Many camps drew on artesian wells for their drinking water. According to the report, because such wells were already contaminated with oil from oil fields, this “is an old problem that is being exacerbated by the increased population.”

In Albania and FYR Macedonia, the Kosovar refugee camps added significantly to their host countries' waste disposal problems. According to the REC *Assessment*, camps were producing 250–500 kilograms of waste a day, principally paper, plastic, and cans.

In the war-torn regions of the Balkans, environmental awareness appears to be low for the average citizen. According to relief workers in FYR Macedonia and Albania, there is virtually no garbage collection and there are no supervised landfills. In Albania, says Gregory, waste management consists of finding “a spot where there's a drop-off beside the road, and by mutual agreement everybody just stops and dumps there.”

Steve Kosokoff, a retired American professor who interviewed refugees in FYR Macedonia, made a similar observation. He was visiting a Romani (Gypsy) settlement near Skopje with a woman who had brought along a can of soda. She was told to just drop it on the ground to dispose of it. The country is “virtually littered with trash,” Kosokoff says. “Where it's windy, near a garbage dump, trees look like they're in bloom with plastic bags snagged on the limbs.”

Bomb Threats

NATO admitted in May that its aircraft were dropping bombs made from DU, which is used in bombs intended to puncture armored vehicles because it is denser than lead. DU can vaporize into tiny particles when a bomb explodes, releasing uranium oxide into the air. High concentrations of DU in the body can cause kidney failure, and DU's beta radiation (emitted as it decays) may damage DNA. In a 5 June 1999 article in *New Scientist*, a NATO spokesman, apparently in a misguided attempt to allay fears about DU, stated that the element is “no more dangerous than mercury.” But British biologist Roger Coghill of Coghill Research Laboratories in Gwent told the BBC in July that he expected an additional 10,000 cancer deaths in the Balkans from exposure to DU. DU has also been implicated in Gulf War syndrome, although a study by the RAND Corporation titled *A Review of the Scientific Literature As It Pertains to Gulf War Illness: Volume 7, Depleted Uranium*, published in 1999, found no significant link between DU and the syndrome. However, because the report drew almost entirely on research on other forms of uranium and because very little research has been done directly on DU, it recommended further research.

Another threat comes from unexploded munitions. In a 14 July 1999 article in

Jane's Defence Weekly, Paul Beaver estimated that there are more than 10,000 land mines on Kosovo's borders with Albania and FYR Macedonia and that there may be as many as 3,000 unexploded bombs littering agricultural areas near airports and military installations as well as in Kosovo's waters. According to the UN's Mine Action Centre in Sarajevo, Bosnia and Herzegovina, unexploded cluster “bomblets” (the smaller bombs that result from the breakup of cluster bombs) with their bright yellow and red stripes and small parachute on top are likely to draw the interest of children. An unspecified percentage of all cluster bomblets fail to detonate before reaching the ground and can explode later, possibly in the hands of children. Terry Heselius, Mercy Corps International's Kosovo country director, says about five people a day were being killed by land mines after the Kosovars returned to their homes. “The cluster bombs that were dropped by NATO [are] a bigger problem,” he says, “because they're unmarked.” For land mines, he adds, “we have maps where the Serbs planted them, and the Kosovo Liberation Army has maps, but no one is aware of where all the cluster bombs were dropped.” Croatia and Bosnia and Herzegovina also have possibly millions of unmarked land mines from the fighting there in the early 1990s.

One of the most widely publicized bomb targets in the fighting in Kosovo was the industrial site at Pancevo, Serbia, just across the Danube River from Belgrade. The site contained petrochemical and oil refineries, a nitrogen fertilizer factory, an ammonia plant, and a vinyl chloride plant,

along with residential buildings within 150 meters of the fertilizer plant. The Pancevo petrochemical complex was heavily damaged by bombs. In a report titled *Overview of Ecological Consequences of NATO Bombing Since March 24, 1999*, Serbian professor Radoje Lausevic of the Serbian Ecological Society at the University of Belgrade stated that 1,200 tons of chloroethylene and unknown amounts of phosgene and chlorine were released into the air. There were reports that large clouds of smoke drifted near Belgrade within which the concentration of chloroethylene was measured at 10,600 times the permitted level. When ingested or inhaled, chloroethylene (also called vinyl chloride monomer) causes weakness, abdominal pain, gastrointestinal bleeding, and liver cancer, according to the U.S. Occupational Safety and Health Administration. Phosgene is extremely toxic with short-term inhalation, according to the U.S. EPA, and can cause severe respiratory problems such as pulmonary edema, emphysema, and death, as well as eye and skin irritation. Long-term exposure may cause irreversible pulmonary fibrosis and emphysema. The U.S. EPA also says that inhaled chlorine can cause coughing, chest pain, and pulmonary edema, as well as skin and eye irritation. It is also toxic to water and soil organisms.

Meanwhile, an estimated 1,400 tons of ethylene dichloride were dumped into the Danube, possibly by workers fearing an explosion. Ethylene dichloride, also known as 1,2-dichloroethane, can damage the heart, central nervous system, liver, kidneys, and lungs, according to the ATSDR.



Deadly leftovers. Serbian policemen recover an unexploded cluster bomb from a field near Gracanica Monastery outside of Pristina in Kosovo.

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Animal studies suggest that it can also damage the immune system and increase the incidence of tumors and cancer via inhalation and skin contact.

Unknown quantities of sodium hydroxide and hydrogen chloride also leaked into the Danube. Sodium hydroxide is a corrosive that can cause severe irritation to the respiratory tract, according to the Canadian Centre for Occupational Health and Safety. Skin or eye contact can result in severe burns, ulceration, and scarring. Ingestion can lead to severe pain, burning of internal issues, vomiting, diarrhea, and death. Hydrogen chloride, or hydrochloric acid, is similarly corrosive, causing burning and scarring of tissues, blindness, pulmonary edema, and dental erosion, according to the National Safety Council's Environmental Health Center.

The REC *Assessment* detailed these releases, saying that "given the available information, it can be stated that so far there is no evidence of a large-scale ecological catastrophe, but pollution is very severe in the vicinity of targeted industrial complexes." (The BTF made a similar observation.) The REC report noted that the war will make it more difficult for both governmental and nongovernmental environmental workers in the affected countries to pursue remediation because the countries are so weakened economically and structurally, and other issues will take priority.

Assessing the war damage is particularly difficult because prewar levels of contamination were unknown, or at least unavailable, to the investigators, and it would be in Serbia's interest to convince the world that NATO had caused the pollution. According to a 23 July 1999 article from the Environment News Service Web site (<http://ens.lycos.com/>), after the war ended, an air pollution study group from the Bulgarian Academy of Sciences found that pollution levels remained "within the usual variations of industrial air pollution with domestic and transboundary origin." In addition, the REC *Assessment* said that three mobile monitoring stations along Bulgaria's border with Yugoslavia showed that concentrations of volatile organic compounds had not exceeded "usual limits" and that concentrations of methane and non-methane hydrocarbons were "in the ordinary range." Yugoslavian Federal Minister for Foreign Affairs Zivadin Jovanovic reported in a letter to UN Secretary-General Kofi Annan that the NATO bombing of refineries spilled a 9-mile-long, 400-yard-wide blot of oil into the Danube, but Bulgarian authorities had noticed large oil spills on the Danube as early as January 1999, before the bombing began. The uncertainty regarding

pre- and postwar pollution was described understatedly in a 29 July 1999 article from the Environment News Service by BTF leader Pekka Haavisto as "a highly political issue."

The BTF report found no widespread ecological disaster but noted four industrial hot spots—Pancevo, Kragujevac, Novi-Sad, and Bor—that required both immediate and long-term remediation. BTF investigators tested both surface and deep soil and groundwater at the sites. Their results showed significant pollution predating the NATO bombing. The report also urged that the canal leading from the Pancevo site to the Danube be blocked off and that the Danube be monitored and treated to reduce both the acute pollution from the war and chronic industrial pollution. It further recommended removing DU sources and establishing health testing programs for people in areas where DU had been found. Unexploded cluster bombs were the primary problem in protected ecosystems, and interim housing was the most immediate need of returning refugees.

Perceptions and Truth

In the postcommunist era, stories are common in the West about communist countries' complete neglect of environmental issues in deference to industrialization in support of military objectives. It would be easy to assume that the Balkans are more polluted than Western Europe or the United States ever were and that these countries had no environmental laws or regulations before 1989 and the fall of communism. But this is not the case.

Anna Phillips, program manager for CEE at the U.S. EPA, says that formerly communist countries are not by definition more polluted than the rest of Europe or the United States. "They're simply behind in addressing the problem," she says. She com-



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An uphill battle. Environmentalists, such as these members of the Sighisoara Ecologic Club (shown monitoring a stream for bacterial and chemical contamination), are hampered by memories of political intimidation, lack of public awareness, and a migration of leadership to government jobs.

pares them to the situation in the United States 30 years ago before the advent of the environmental movement and subsequent protection legislation.

Gregory Hess, policy development officer of the WHO's Partnerships in Health and Emergency Assistance, says, "Every socialist country in the European region has environmental legislation. On paper, the standards are very strict, quite often more strict than those of the West." Yet enforcement mechanisms are weak, he says. Fines are often imposed, but they are so low that they are simply a cost of doing business for polluting companies or state-run factories.

It is also difficult to generalize about the environmental awareness of the public. In many countries there is voluminous record keeping, but the public had no access to the information during the communist era. "Scientists collected data that were often of dubious quality and which were considered classified," Phillips says. "They compiled large statistical yearbooks but nobody read them." In Zlatna, says Billig, people were aware of a problem but lacked the tools and

a model for doing anything about it. "Taking individual initiative or getting together as a group to try and solve a problem was not something people had experienced," she says.

It must be emphasized, Gregory says, that such indifference to environmental values may reflect not so much people's ignorance as their feeling of impotence. For example, he says, "In Albania there's an absolute, total mistrust of government." Romania, too, is emerging from a long tradition of paranoia. Billig was told by some of her Romanian colleagues that just a few years earlier they would have been followed and reported to government authorities if they were seen talking to a foreigner in public. Maria Toth, leader of the Environmental Education Group of Romania's nonprofit Health Environmental Regional Organisation, describes the reign of former dictator Nicolae Ceaucescu: "Only one opinion was accepted at that time: the official opinion. If you started to organize, you were discovered very soon and put in jail."

International environmental agency and humanitarian workers encounter a more subtle obstacle as well. Billig found that despite her Romanian colleagues' education and good intentions, they initially had two concerns that hindered their ability to organize. First, they were afraid that if the child lead problem in Zlatna were publicized, the community would be humiliated and the children would be stigmatized because of their developmental disabilities. Second, they had no experience in developing and implementing grassroots projects. "The whole concept of collaborating on the design and development of public education materials and commenting on draft documents, for example, was so foreign," Billig says.

In addition, under communist regimes many environmental regulations were unrealistic, and people became accustomed to simply ignoring them or going through the motions. Phillips says that when the U.S. EPA started working in CEE countries, there was strong resistance to the idea of easing the strictness of the regulations, even on an interim basis in the interest of getting an enforceable environmental standard in place. The new governments did not want to be seen as backing away from environmental protection.

Outside Help, Outside Pressures

Balkan countries continue to face daunting challenges in improving their citizens' environmental health. As ever, the conflict between economic needs and environmental health will be difficult to resolve. There are some external influences, however, that may move the Balkans toward both more stable

economies and healthier environments. Agencies from the UN, the EU, and the United States as well as many humanitarian organizations are increasingly involved in CEE countries. Those countries wanting to join the EU face a series of environmental requirements. Currently Hungary and Slovenia are in official accession negotiations with the EU, but progress is slow. In April 1999, the Slovenian government said its lack of sewage collection and treatment facilities would necessitate a transitional period and Slovenia would not be in compliance with EU standards until 2015 to 2017.

Many industries in the Balkans during the communist regime were extremely inefficient because they were not required to turn a profit, but were operated mainly to keep people employed. There was no incentive to improve on obsolete technologies. Therefore, most existing facilities will need to be upgraded substantially before they can make a profit, and these upgrades will include technology to reduce pollution and improve environmental protection.

The U. S. Trade and Development Agency is active in creating opportunities for American environmental technology companies in CEE countries. The agency organized a conference on the topic in Budapest in November 1999 and has sponsored assessments of potential projects in the region including feasibility studies for a four-star Hilton hotel in Sarajevo and for converting a Romanian factory to the production of light-gauge galvanized steel.

It may be a tough sell, though. Jonathan E. Twining, an environmental science instructor at Eastern Nazarene College in Quincy, Massachusetts, performed an environmental assessment in Romania in advance of a proposed environmental relief and development project there. Twining says he has tried to interest two environmental remediation companies in Romania, but "both declined because they had heard it was difficult to get paid for contracts." This is typical of problems that must be overcome if foreign investment is to be encouraged: governments will have to assure investors that their money will be both safe and used in compliance with international environmental standards. "For large companies that work internationally," says Billig, "they've seen the writing on the wall and they are concerned not only about the economic return on their investment but about the extent of environmental liability they will acquire."

According to the U.S. Geological Survey, a number of foreign and multinational companies and consortia have acquired interests in Balkan mining and processing facilities. Several have entered

into joint ventures for which they will provide pollution mitigation. For example, Bulgaria required a U.S.-Irish mining company called Homestake to introduce technology to handle arsenic produced during extraction of gold, silver, copper, and other metals from a single deposit. In Hungary, prospective buyers of stock in the newly privatized Ajka Aluminum Company were required to agree to the abatement of environmental degradation.

Much of the impetus for environmental progress in the Balkans has come from nongovernmental organizations. Once constrained under the communist system, they have mushroomed in the decade since its dissolution. The REC Web site now includes a database of such groups with more than 2,700 listings, of which more than 1,000 are located in Balkan countries.

Environmental nongovernmental organizations actually contributed to the communist breakup. According to former U. S. EPA official Dan Beardsley, who worked with CEE countries, there was a large pool of very well educated scientists and engineers who became the vanguard of the environmental movement because they had access to a great deal of information unavailable to the general public. During the post-Cold War era when the Soviet bloc was thawing, concern for the environment came to be seen as harmless by the Soviet-aligned governments so environmental groups were fairly safe in speaking out. Ironically, says Phillips, the communist collapse was "a big blow" to the environmental movement because a lot of the leaders of the nongovernmental organizations left their groups for government jobs, which left the environmental community weakened.

The challenge for all stakeholders will be to integrate environmental health knowledge and values into the emerging market economies. It is too soon to tell if that challenge will be met. Environmental organizations continue to face difficult struggles because political strife and economic conditions in their countries overshadow environmental considerations and people are often not well educated about the connection between environmental contamination and their health. Says Hess, "Environmental activism is a leisure activity. It is generally practiced by people who are freed from concerns [about] where their next meal is coming from, and it is very often not practiced by those who are most harmed by environmental damage."

Valerie J. Brown