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Environmental Issues in Bosnia and Hercegovina

Introduction

Bosnia-Hercegovina declared sovereignty and seceded from the residue of the Socialist Federal Republic of Yugoslavia (SFRJ) in October 1991, following similar action, first by Slovenia, then by Croatia and after a plebiscite, boycotted by many ethnic Serbs, in which a majority of those voting backed independence. The following April, Bosnia-Hercegovina (BiH[a]) was recognised as a legal entity by the EU and USA. A month later it was admitted to the UN. With secession came internal conflict and external aggression, fomented by nationalists in the Croat and Muslim as well as Serb communities. The war left a quarter of a million people dead, maimed or traumatised, and the economy, infrastructure and physical and social fabric of the country in ruins. It seems fitting to dedicate this chapter to the large numbers of Bosnians (of all nationalities as well as none) who tried their utmost to prevent the war and who continue today to work for a multiethnic, democratic and environmentally healthy Bosnia. In particular, it is dedicated to those who remained in its capital Sarajevo throughout its siege by those who hoped to destroy both the city and the ideals that it represented.

Any discussion of current environmental issues in Bosnia and Hercegovina must be framed by three considerations:

- the biophysical characteristics of the region and its socio-cultural history and heritage, including the economic and political legacy of BiH's status as a former republic of SFRJ and its inheritance of environmental problems (and achievements) of the socialist era (Jancar 1987; Fisher 1990; IUCN 1991a, b; Terselic and Juras 1991).
- the immense human, material and environmental cost of the 1992-95 war which followed Yugoslavia's collapse and which all but destroyed the economy and the physical and social infrastructure of BiH.
- developments subsequent to the war (including patterns of economic and socio-political transition), some environmentally negative, others positive, which provide pointers for the future.

Physical and ecological features

Bosnia and Hercegovina is a small country of 51,200 km². A small 'stem' of territory joins it to the Adriatic at Neum (interrupting the southernmost coast of Croatia just south of the Neretva delta, some 50 km north of Dubrovnik) and provides a coastal strip of a mere 23 km. Of Bosnia's 1500 km of terrestrial borders (some half of which is demarcated by rivers), roughly 2/3 adjoins Croatia to the northern and south-western sides of the triangle, the remainder (on the Eastern side) abuts Serbia and Montenegro (fig 1).

Figure 1. Map of BiH

Over 55% of the land surface of BiH is defined as mountain (700m and above). A similar proportion consists of dinaric limestone and dolomites, much of it characterised by

a. *The territory of Bosnia and Hercegovina is commonly referred to as 'Bosnia' by outsiders as well as by many former Yugoslavs, but in fact consists of two distinct historical entities, one of which provided the basis for the short-lived attempt to set up a Croatian entity of 'Herceg-bosna' during the war.*

karstic features. The whole territory is subject to occasional and sometimes destructive earthquakes. The parallel orientation of coastal mountains leads to great climatic variation within a small area. For example, average annual rainfall varies from 730mm (Bijeljina) to 1975mm (Ljubinje); winter temperatures of 10 or 12 °C are common on the coast at the same time as heavy snow blankets Sarajevo, only 120 km inland.

Vegetation follows climate and is Mediterranean towards the coast, continental inland. Forest covers almost 50% of the land surface: included in this total are some significant areas often cited as 'virgin' climatic-climax communities. The 1,400 ha of Peručica between the mountains of Maglić and Volujak represent the largest area of near-natural forest complex in south east Europe. Anthropogenic vegetation types in Bosnia range from small fields and alpine meadow inland, to maquis, Mediterranean scrub and wetlands towards the coast, to alpine pasture in the highest regions.

Economic and social background

A characteristic of Bosnia (which it shares with other southern Republics and in which it is a mirror of the Balkans as a whole) is ethnic and cultural diversity. Of its population of just over 3.2 million (the population at the 1991 census was 4,36 million), no one group forms an absolute majority. Since the end of Turkish rule the largest group has been the Muslims (with between 40 - 44% of the population), followed by Serbs (31 - 40%) and then Croats (17 - 22%). Estimates of numbers of different ethnic-national groupings vary according to source as well as date. Only 5% of the population at the 1991 census described themselves as 'Yugoslav' (i.e., repudiated any ethnic affiliation). Patterns of settlement were very mixed so that pre-conflict ethnic maps resembled a patchwork blanket or (like the countryside itself) a landscape of small fields.

Despite eruptions of populist nationalism, declared ethnicity was for many people an arbitrary matter, depending on which parent's origin was followed. For most it was a nominal category, significant in the years prior to Yugoslavia's collapse only because the alternative - to declare oneself a Yugoslav - had by the mid 1980s become increasingly unfashionable. Moreover such affiliations were cultural rather than religious. Many individuals (at least in towns, as well as those from partisan families or villages) were secular; many had little time for the established religious institutions. Only since the conflict has religion become, for many, a way of declaring their nationalist affiliation. As virtually all knowledgeable commentators (including those hostile to Yugoslav socialism) have observed (e.g. Donia and Fine 1994; Malcolm 1994; East and Pontin 1997), contrary to popular perceptions of 'ancient ethnic hatreds' the causes of Bosnia's tragedy came not from the prejudices of its people but from the scheming of opportunist nationalists (Serb, Croat and Muslim), and from the fatal mis-comprehension and interference of outsiders. Newly created political divisions do not in general conform to any natural geophysical areas (a particular problem today in catchment areas where source and consumption of water may be in different entities); in the context of this chapter their prime significance is their debilitating effect on united action for protection and remediation.

A second characteristic of BiH which it shares with other southern Balkan states is its historically low level of socio-economic development; it was one of the less developed republics of pre-1991 Yugoslavia. Nevertheless, from 1945 as in the rest of the SFRJ, urbanisation and industrialisation were the major determinants of environmental change. BiH is rich in mineral resources, including coal, iron ore, bauxite, manganese, copper, chromium, lead, zinc and silver. Much post war industrial development was promoted by cross federal transfers of investment from the developed 'north' to the poorer south of the former Yugoslavia; this was motivated as much by political considerations as by logistic

factors to do with the location of raw materials, energy supplies or transport routes. A particular feature of post 1945 development in BiH was the establishment of military bases and munitions production facilities. The Republic had some 40% of former Yugoslavia's armaments production capacity including tank and aircraft manufacture.

In the first three decades of the SFRJ, the population of BiH grew by 40%, and the economy by an average of 6.2% p.a., although the rate of both population and economic growth slowed in the 1980s. The single most apparent consequence for the landscape was the establishment of several large industrial complexes and a rapid (and in some towns, chaotic) growth of suburbs at the expense of the countryside. Much of the suburbanisation has been 'planned' (usually high-rise) development by city authorities or individual enterprises; much of it however has simply grown (without planning permission or proper sewage or transport systems) as privately built incremental sprawl. In addition to large (often internationally financed) industrial plant, the unique Yugoslav system of self-managing enterprises coupled with lax planning controls encouraged numerous small scale enterprises. One of the foci of post-1945 investment, Zenica is commonly held to have been one of the worst polluted cities in the former Yugoslavia. In some other cities, including Sarajevo, the geographical spread and location of industry has been constrained by mountainous terrain though this has also exacerbated the consequences of pollution, as exemplified by Sarajevo's frequent temperature inversions. Prior to independence BiH as a whole had 20% of the surface area of former Yugoslavia, 18% of its population and 12% of its GDP, but contributed 32% of its atmospheric pollution (Independent Bureau for Humanitarian Issues 1988)

The obverse of post 1945 urban development has been the 'undevelopment' of the countryside. The influx of young families to the towns left innumerable farmsteads to be cared for by ageing parents or (in marginal areas) to be abandoned altogether. At the same time as many of the older houses in the countryside became derelict, new ones have been built, often close-by, sometimes by the families of the original owners, sometimes by newly affluent town dwellers as weekend cottages ('vikendica') and holiday homes. The result has in some areas been a significant conversion of much farmland and woodland to concrete and tarmac, whilst in other areas fields have reverted by natural succession to scrub and secondary woodland.

The War and its aftermath

In addition to the large numbers of dead (between 5 - 7 per cent of the population; estimates from different sources vary widely) the human costs of the war include over 200,000 wounded, of whom 13,000 are permanently disabled. Very few people continued to live in their own homes throughout the war, and some 2.6 million people (between 55 - 62 per cent of the population) were displaced. Since the Dayton accord many of these have returned home (though under 10% of returnees have gone back to places where they were part of an ethnic minority), but there remain over 1 million refugees and displaced persons, roughly equally distributed between the two entities. Estimates of material destruction and damage are unreliable since returns by property owners are certainly inflated by hopes of reparation, however the level is certainly very high. It is claimed that some 63% of all dwellings in BiH sustained at least some damage and that as much as 18% were totally destroyed. Whole residential districts of Sarajevo have been reduced to rubble. Throughout the whole of BiH productive installations, communications and energy utilities were often as significant as military targets as the focus of destruction. As much as 78% of the industrial capacity of BiH may have been destroyed and production is only now beginning to recover from its 1994 low of 4% of the 1990 output.

Most parts of the communications infrastructure (including 59 bridges) have been damaged by military action or lack of maintenance. Over three-quarters of Bosnia's electrical generating capacity was damaged; some is still out of operation. Water and sewerage systems in some localities remain non-functional. Educational facilities have been severely damaged and enrolments at all school levels are estimated in some areas at around 50% below eligibility. Hospital facilities (as measured by the number of available beds) are less than two-thirds their pre-war levels (World Bank 1998). War damage in the Republic was estimated in 1996 by Hans Van den Broek, EU Commissioner for central and south-east Europe, to amount to between \$30 and \$50 billion (Simpson 1996). Physical destruction has been accompanied by economic collapse. 'Real' unemployment is currently (1998) some 80%; annual per capita income has fallen to around \$500 (compared to \$1,900 in 1990). Such statistics provide a backcloth against which a concern for the environment can appear almost an indulgence. It is certainly the case that most foreign aid has been directed, initially, towards humanitarian assistance, then subsequently (and inadequately) towards economic rehabilitation. However the environment is important not only in itself but because it has the capacity to provide a focus for action which can transcend ethnic differences and the continuing division of the country into two separate 'entities'.

That division is (next to the human suffering and the physical destruction which is immediately apparent to any visitor) the single most significant legacy of the war. The wartime territories which emerged as a consequence of the shifting conflicts and alliances between Bosniak, Croat and Serb forces - namely the Muslim/ Croat 'Federation of Bosnia and Hercegovina' ('FBiH' or 'Federation', covering 51% of the territory) and 'Republika Srpska' ('RS' covering some 49%) - were recognised in the November 1995 Dayton Accords (and confirmed in the subsequent December 1995 Paris Peace Treaty) as separate, semi-autonomous entities within one legal state to be governed by a bicameral National Assembly. The reality is that whilst the Federal government in Sarajevo often aspires (in the absence of any functioning governmental structures at state (i.e. BiH) level to speak for the whole of BiH, Republika Srpska understands itself to be effectively independent. Significant decisions affecting FBiH, RS, or BiH as a whole are taken in the Office of the UN High Representative (OHR) and by other members of the OHR Advisory Council (including the OSCE, UNHCR, SFOR, IBRD and IMF). The Spring 1999 NATO bombardment of Serbia has, if anything, hardened the resolve of Serb nationalists to have nothing to do with an integrated BiH. In addition, much of the Croat part of the Federation is, or was, until the February 2000 elections in Croatia replaced the ruling nationalist party with a broader left coalition which renounced all claims on the 'Croat' part of BiH) effectively ruled from Zagreb (under the Tuđman administration, many Hercegovinian Croats occupied positions of power and influence in Croatia). Inevitably, official environmental pronouncements often have a political subtext. In the context of this chapter, one consequence is that good information for the whole of BiH is difficult to come by. Much is unpublished and/or consists of individual estimates; some is merely anecdotal. All statistics relating to the area should be treated with caution and those in this chapter should be regarded as 'best estimates' only.

A major environmental problem (unique in Europe to BiH until recent conflict in Kosovo) is the continued hazard of **land mines**. Estimates of the numbers of mines laid (by all 'sides') during the war range from 350,000 to 35 million. A realistic estimate is perhaps 2 - 3 million mines, in some 16 thousand minefields. Despite efforts at clearance, aided by foreign governments (Austria has given 3.5m DM for satellite surveillance of mined lands) and companies (such as Caterpillar International) which have exploited opportunities for the sales of mechanised demining equipment, only a fraction of minefields have to date been cleared. Those that have, are mainly in and around inhabited areas, and on some of the settled front lines where the densest minefields were laid and their locations are known. In remoter areas and in regions where front lines continually changed (for example in the

Muslim enclaves around Srebrenica, Žepa and Gorazde) many minefields still exist, their location is unclearly defined and injury and death still regularly occur, particularly to children (United Nations High Commission for Refugees 1996). Some rural areas are regarded as 'no-go' and it is estimated that some 20% of the wooded area of BiH may still be mined (Hadziabdic 1997). Even in Sarajevo the Jewish Cemetery remains heavily mined and there has yet to be any significant attempt to clear it. What impact the continuing - or past-presence of mines may be or may have been on wildlife is unknown; there has been and is no monitoring. What is clear is that for many years to come, mines will remain a major environmental hazard, and their removal will be a precondition for effective environmental management.

Legislation, policy and planning

The formal principles of environmental protection in BiH derive from the former Yugoslav Federal constitution whereby all natural resources with the exception of private holdings of up to 10ha were defined as social property. In principle this might have permitted a higher degree of social awareness and care for the environment than in (for example) the UK where land is privately owned and environmental protection requires limitations on property rights, often involving compensation. In practice, social ownership often meant that 'what is everyone's is no-one's' and financial mechanisms for securing environmental objectives were lacking. Particularly in the case of industrial undertakings, environmental costs (for example, of air and water pollution) were, even when recognised, perceived as 'externalities' and were often disregarded in policy decisions. In this respect the situation in SFRJ differed little from that in western European countries, in that only where there was specific legislation backed by mechanisms for monitoring and enforcement, was protection effective. However, the high levels of devolution and decentralisation in the former Yugoslavia, combined in the south of SFRJ with generally lower level of socioeconomic development. The consequence was that although environmental pressures were often of lower intensity than more 'developed' areas in the North, lower levels of environmental protection meant that their effects were often much greater.

One of the features of socialist Yugoslavia was its unique system of workers' self-management, with enterprise autonomy (and a degree of market discipline) superimposed on an essentially socialist economic base. This was coupled with a high degree of decentralisation, a high level of political awareness and debate, and openness to 'western' ideas, influence (and investment). In all but the most essentially federal matters (such as defence), legislation and policy-making was devolved to the constituent republics. Within each republic, implementation and decision-making was often devolved to a local level. Day-to-day environmental regulation and management was generally the responsibility of municipalities or individual enterprises, subject to general policy guidance (and funding) from the responsible ministries, together with advice and/or regulation via a parallel system of semi- autonomous institutes (for example water protection, natural and cultural heritage protection, urban planning). This broad situation remains unchanged by independence but the War has inevitably disrupted communications and policy implementation, which in general remains distinct within the two entities. There were no provisions in the Dayton accords for any all-BiH structures of environmental management, with the exception of a Commission to preserve national monuments, which has not so far been instituted. In the Federation the principal ministries (of Physical Planning and Environment *Ministarstvo za prostorno planiranje i okoliš* and of Agriculture, Water Management and Forestry *Ministarstvo za Poljoprivredu, Vodoplaniranje i Šumarstvo*) try to retain at least a 'watching brief' across the whole of the former Republic. In practice however they have very little contact with their counterparts in Republika Srpska.

Environmental law in both the Federation and RS is still therefore based largely on former Yugoslav environmental regulations but policy and implementation within the two entities has diverged. By January 1999 Federal BiH had in draft new framework laws on Environmental Protection (*Zakon o Zaštiti Okoliša*) and on Nature Conservation (*Zakon o Zaštiti Prirode*), both closely based on those recently adopted in Slovenia and Croatia. RS, in turn, had in draft its own environmental law, which is a copy of the law currently in force in Serbia. This led to concern on the part both of OHR and international bodies, and of environmentalists within the respective entities, that once adopted, the very different approaches of this draft legislation would be yet a further hinderance to future collaboration. In July 1998 a Memorandum of Understanding was signed at the Regional Environmental Centre (REC) in Szentendre, Hungary. The Szentendre Agreement is one of the most far-reaching agreements concluded to date between the two entities. It accepts the fact that environmental issues extend across the border between the two states and provides for the institution of an Environmental Steering Committee (ESC) to generate common approaches to environmental issues across the two entities. The Committee is comprised of eight members, (four from each of the two entities) plus representatives of the Office of the High Representative, USAID, the European Commission, the World Bank and other bodies as non-voting members. Its remit includes; harmonisation of environmental legislation and standards, environmental monitoring, information systems and plans for emergency situations, physical planning, and relations with the international donor community (Csagoly, 1999). Subsequent work, financed by the Japan Special Fund Fund, resulted in the employment of local coordinators to work in the REC offices in Sarajevo and in Banja Luka and has focused on the development of pilot National, Regional and Local Environmental Action Plans (EAPs, with the possible objective of a NEAP for the whole of BiH), and on legislative co-ordination between the two entities. Early progress included the initiation of a process of drafting a new environmental law applicable across the whole of BiH. This involved a commitment by the responsible ministries in both entities to withdraw the existing draft laws from further parliamentary process. The intention (accepted by both Ministries) was to institute a new and transparent process with opportunities for public and NGO involvement, resulting in new environmental legislation across the whole of BiH. This could also have led to BiH participation in international conventions including the Basel, Danube and Aarhus conventions (REC and Japan Special Fund 1999). At the same time, international agencies (including the OHR) expressed significant doubts as to whether such an 'internal' process could yield concrete results within a reasonable timespan. An EU funded project was therefore established in early 2000 to draft an all-BiH framework law using independent contractors. Any harmonisation of environmental legislation across the two entities will be rendered more difficult, however by their very different governmental structures. In particular, FBiH is characterised by a high degree of devolution of decisionmaking to its 10 constituent cantons (80% of Federation income is spent at canton or municipal level) which contrasts strongly with the high degree of centralisation in RS.

The Szentendre Agreement also accepts that many environmental issues also involve cooperation with neighbouring states and should therefore, as with foreign policy in general, fall within the competence of the common institutions of BiH. Presently, the governments of both entities in BiH formally regard themselves as bound by a number of international conventions, by succession from the former Yugoslavia. These include the 1973 (Washington) Convention on International Trade in Endangered Species (CITES) the 1979 Ramsar Convention and the 1987 (Montreaul) Convention on Substances that deplete the Ozone Layer. However, under the Dayton accord the entities are not themselves able individually to enter into any international agreements, which can only be done at State (BiH) level; and in the absence of effective state structures BiH is unable to accede to new agreements and is therefore not party to major conventions such as those arising from the 1992 Earth Summit, including the UN Framework Conventions on Climate Change and the

UN Biodiversity Convention. Nor is it effective party to other international agreements or programmes (such as the Pan European Biological and Landscape Diversity Strategy, or the Aarhus Convention) drafted subsequent to 1990, however there is considerable interest in both academic and government circles, as well as NGOs in doing so, and representatives from both entities attend international meetings.

In addition to obvious problems of enforcement and monitoring of legislation, there is an additional issue of transparency. Partly as an inheritance from the previous culture of official institutions, and partly as a reaction against constant external examination, there is a reluctance to open the working of organisations to external scrutiny. This applies even to environmental data which has no sensitivity in a political or commercial context. The limited data that exists is not regarded as appropriate for the public domain, and this creates a disincentive to the collection of additional information which might be useful to make effective assessments of environmental quality. For example the Institute of Water Resources in BiH is unable to provide information on river quality which might help to assess the consequences of war, or the effectiveness of remediation policies. Accession to the June 1998 Aarhus Convention (formally, the 'Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters' signed by the EU and 35 governments) would be a significant step because the Convention links humanitarian concerns and civic rights (including freedom of information) to environmental protection.

The urban environment

One of the features of the siege of Sarajevo is the way that despite the war 'ordinary life' continued for many people in the most difficult circumstances. This was reflected even in policies for environmental improvement. A major scheme for the post-war revitalisation of Sarajevo was produced by the Institute for City Planning *Zavod za Planiranje Razvoja Grada Sarajeva* at the height of the war (February 1993 - June 1994). Proposals included a visionary programme of tree planting to create a system of 'green corridors' throughout the city, each with its own distinct species assemblage related to microclimatic features of particular areas and each linked with Forest Parks (Trebević, Bulozi) and Nature Parks (Bjelašnica, Ozren, Jahorina) on the city periphery (Zavod za Planiranje Razvoja Grada Sarajeva 1994).

Subsequent to the conclusion of the Dayton Accords, priority has been given to repairs to (or clearance of) damaged property and the recommissioning of industrial enterprises. Numerous reconstruction and development projects have begun, many of them financed with external assistance. Significant donor bodies include the World Bank, USAID and several national governments. Industrial production has begun to recover and is currently (Spring 1999) some 15 to 20% of pre-war levels. Prospects for environmental improvements (including implementation of wartime plans for a 'green Sarajevo') have taken second place to these priorities and have also been much frustrated by new political conflicts.

One difficulty is that the situation regarding property restitution and privatisation for public properties remains confused. This has so far obstructed the implementation of management proposals for Sarajevo's cemeteries, which form such a significant feature of the city's landscape and which were established to a large degree on land nationalised in the process of agrarian reform in pre-socialist Yugoslavia, between 1919 and 1939. It seems likely that property restitution will be limited to land appropriated subsequent to 1945, however this process will be much more complex than even in other former Yugoslav republics because of the major shifts of population that have occurred since 1991.

The elaboration and implementation of environmental policies is constrained not only by the division of Bosnia into its two constituent 'entities' but also by conflicts of authority within these entities, both at government and municipal level. For example, agreed plans to plant trees in Sarajevo's largest central park have been halted by parallel proposals for building developments. Planning issues outside the central area are dogged by friction between the City and the Canton - the latter swelled by an influx of refugees from rural areas. One example of such conflicts in an environmental context is a proposal for new urban development over an important Neolithic archaeological site in Ilidža, where the conservation objectives of the City authorities are directly opposed by recently arrived 'New Sarajevans' whose physical circumstances mean that jobs and accommodation are priority issues.

The ambient environment

One of the consequences of the war was the collapse of monitoring programmes, the severing of links between individuals in university, government and NGOs, and the physical destruction of records, including scientific data that had been painstakingly collected over a long period. There is currently little ongoing environmental monitoring. It is clear however that the consequences of the war for the ambient environment have been both mixed and geographically uneven. In some places damage to processing and storage facilities has produced pockets of intense local pollution; elsewhere, however, economic collapse has meant that industrial pollution has been (temporarily, at least) much reduced.

Generation of industrial wastes plummeted during the war from an estimated 250 million tons in 1989 to virtually zero in 1992 (Federal Ministry of Physical Planning and Environment 1998). However new dumps and stores of wastes of all categories accumulated during and since the war and these remain largely unrecorded. This war time waste includes an estimated 800 tonnes of unused medicines (from some 35,000 tonnes sent as humanitarian aid). Some 90% of these medicines have expired and are unusable, and are stockpiled, particularly in Mostar (FBiH) and Prijedor (RS). Effective means of disposal do not exist within BiH and the price of incineration abroad is estimated at between 2,000 and 50,000 DM per tonne (Independent Bureau for Humanitarian Issues 1988). Scattered but largely unrecorded military wastes together with the legacy of unexploded mines and munitions present a major continuing hazard.

As industrial production develops, the provision of appropriate technical facilities with administrative coordination, backed by legislation, will be critical. Responsibility for waste management in the Federation is split between the Ministry of Physical Planning and Environment, and the Ministry of Agriculture, Water and Forestry, however waste disposal is in general undefined by legislation at a Federal level, except in the most general terms by the Law on Physical Planning (for internal transports of waste) and the Law on Customs (for trans-border transports). Even this is largely ineffectual because of poor or uncoordinated border controls, with the result that illegal movement and disposal of environmentally hazardous wastes is largely uncontrolled.

Effective structures exist only at municipal level. Most domestic solid wastes are disposed of by landfill. There is no independent monitoring of procedures or quality. Hazardous wastes present a particular problem and are dealt with mostly on an ad-hoc basis. There are no operating separation plants or high-temperature disposal facilities for toxic or unstable wastes. Disposal in power plants and cement factories is minimal and where it exists, is performed by poorly trained personnel and is un-monitored. The Federal Government has begun the process of ratification of the Basel convention but little is happening on the ground with respect to infrastructural and organisational implementation.

The most critical environmental issue in BiH is water cycle management. In terms of pollution of surface and subsurface waters, BiH is generally accepted to have been the most polluted Republic of the former Yugoslavia. Pollution was particularly bad in several areas along the valley of the river Bosna (as well as the lower parts of the Neretva valley) where most industrial production was located. Zenica and Tužla were particular black spots for water quality with chemical process and other facilities discharging waste directly into watercourses. Throughout the country, many rivers were of poor quality due to lack of wastewater and sewerage treatment plants. In urban areas only around 70% of households were linked to a sewerage system and these were often inefficient. No tertiary treatment plants existed anywhere. The general recognition of this problem led to the production, just before the war, of a major twenty-year plan for improvement of the water supply (only about 45% of the country by area was connected to a piped water supply) and of waste water disposal facilities of the whole country.

The 1992-5 war seems to have led to some local improvements in surface water quality following temporary cessation of industrial operations. For example, water in much of the Neretva is reported to be of near drinkable quality. At the same time, however, the war has caused a considerable local worsening of the situation particularly with regard to domestic wastes following destruction or disrepair of many municipal facilities. Since the end of the war, all 2200 km of major rivers in Federation areas have been surveyed by the Hydro-Engineering Institute. Although only a relatively limited number of sampling stations were used, these were selected to represent significant catchments. Recorded parameters include suspended and total solids, dissolved oxygen and BOD; pH and bacterial contamination (biological indicators appear not to have been used). The results show only some 3% of all rivers to be totally free of pollution: almost 30% of rivers fall into the category of eutrophic or severely eutrophic. (Federal Ministry of Physical Planning and Environment 1998). The worst pollution seems to be of the river Bosna downstream of Zenica which is claimed by environmental activists to be little more than an industrial channel (Omanovic 1999). Much international assistance from bodies such as the World Bank, USAID and individual member governments is directed to re-establishment of drinking water and sewage systems in RS (Government of the Republic of Srpska 1999) as well as in Federation areas. One of the current features of post war reconstruction is the entrepreneurial activity of foreign firms (for example that of Atkins in promoting small-scale combined heat and power CHP stations). Aid-related infrastructural developments may not always be necessarily environmentally benign, however. A proposal to dam the Neretva at Konjic to create a hydroelectric power station has been vigorously contested by environmental campaigners. More generally, the lack of requirements for environmental assessment means that the environmental effects of many proposed developments are unknown.

The situation with respect to air pollution shows some similarities to that of water quality. It is claimed that with 20% of former Yugoslavia's surface area, 18% of its population and 12% of its GDP, BiH contributed 32% of its air pollution (Independent Bureau for Humanitarian Issues 1988). Pre-war 'black spots' for atmospheric pollutants included Zenica and Tuzla. During the war SO₂ and NO_x emissions fell considerably though peaks of other pollutants recorded during the war included particulates from domestic wood burning in Sarajevo (table 1). These have now in turn been replaced by other pollutants including hydrocarbons and lead from motor vehicles. Such pollutant levels have been exacerbated by other forms of 'aid' including the importation from Germany since the war of some 80,000 secondhand cars which do not conform to EU emission standards. There are no regulations on automobile exhausts in either entity of BiH and the use of unleaded petrol is still uncommon. In other areas the re-establishment of industrial production has restored pollution to its pre-war levels or even above. Annual production of pollutants from Zenica

steelworks has been estimated at 35,000 tons of SO₂, 11,000 tons of dust, and 85 x 10⁹ cu meters of smoke (Omanovic 1999). Pollutant production is exacerbated by the topology of the country which has resulted in the location of urban and industrial development in valleys where air circulation is often poor means so that atmospheric pollutants are often localised, but concentrated. This is particularly apparent in hot weather in Sarajevo and Zenica where temperature inversions are common, resulting in occasional but high pollutant levels.

Table 1: Air quality in Sarajevo

	SO ₂ concentrations (ug/m ³)		Particulate matter (ug/m ³)	
	1990	1995	1990	1995
Annual Average	84	12	38	38
Winter average	143	18	62	54
Maximum (24h)	486	66	235	628
98th percentile (24h)	382	51	175	304

Source: Meterological Institute Bjelave 01 station: city background.

The rural landscape

Over 40% of the land surface of BiH is classified as agricultural land (20% arable, 25% meadow and pasture: 2% permanent crops). However agriculture accounted for only some 9.0% of GDP in 1989 and even before the conflict, the country produced less than 50% of its food requirements. The lower lands of northern Bosnia support some wheat and corn as well as vineyards, orchards and livestock. However, leaching and soil erosion in mountain regions and on slopes, caused by high rainfall and the short inland growing season, leads often to reduced agricultural productivity. Moreover farm holdings are mostly small and were in private ownership, often managed by older people whose income was supplemented by that of their children who had moved to the town.

During the war there was mass movement off the land. In rural areas, where they have been permitted to do so, some families have now returned to their farms and are re-tilling their fields; however ethnic cleansing and the continued division of the country, coupled with low per capital incomes and the chronic shortage of domestic capital, mean that many farms and houses still lie abandoned and derelict. Others have been occupied by refugees but the uncertain (and possibly temporary) nature of their tenure means that even where there is the money to do so (which is rare) there is little permanent investment and many areas have an unkempt appearance. Larger areas of once-farmed countryside remain uninhabited, because of continuing threats to returnees, the absence of habitable buildings, or because of the threat of landmines.

Approximately 48% of BiH is covered by forest. The long history of forest management embodies Austro-Hungarian forestry traditions. These include an emphasis on continuous cover techniques aimed at maintaining sustainable yields. The forest area of BiH is distributed fairly equally between the Federation and RS. It consists of approximately 58% hardwoods (mainly beech, with some oak). The remaining softwoods are principally spruce and fir, with some pine.

Responsibility for woodlands of BiH remains that of regional Forestry Economic Area Administrations *Šumsko Provredno Područje* or SPP, each responsible for between 20k-85k ha of forest including state-owned and private areas. Prior to the war, each of the 85 SPPs

combined regulatory and production functions in accordance with a comprehensive 10-year forest plan approved by the Ministry. The plan specifies forest maintenance, reforestation and silvicultural development and an Annual Allowable Cut within which logging quotas and cut schedules for each woodland area are determined. In reality, poor regulation meant that forest plans were often patchily or poorly applied. As in all other areas of environmental management and policy, the war has caused much greater disruption. The SPPs remain in existence; 43 in Republika Srpska and 45 in the Federation of which five, in Hercegovina, operate outside Ministry control (Citizens Democracy Corporation 1998). Each SPP is also a commercial organisation, cutting timber and marketing logs, relatively free of state control. The SPP can sell timber (cut according to licenses it issues to itself) to any internal purchaser. Exports (currently to Germany, Italy, Croatia and Slovenia) are approved by the ministry which sets minimum domestic and export prices. It is likely that, as in other areas of the former Yugoslavia, the future will see the regulatory activities of the SPPs separated from their executive and commercial functions and that these latter will be privatised.

It is claimed that the war has led to significant deterioration in forest quality, however the nature and distribution of damage seems to vary considerably in different areas, and proper inventories have yet to be compiled. In general, the forests of Republika Srpska seem to be in better shape than those of the Federation. The major causes of damage include uncontrolled cutting (there were significant exports of timber from both sides throughout the war); lack of management (including a neglect of reforestation and of selective felling for improved growth); and direct damage from military action. Large areas of woodland have been affected by uncontrolled fires. It is estimated that between 15-20% of the forest area remains mined and inaccessible; shell and bullet fragments embedded in trees in some areas have lowered the grade of timber and have increased the cost of harvesting it.

The mere 23 km of coastline might suggest at first sight that coastal issues are not significant in BiH. The point is often made, however that the inland catchments draining into the Adriatic (some 25% of the country's land area), especially the Neretva delta, are part of the coastal system. BiH is signatory (by succession) to the Mediterranean Action Plan (MAP) and a number of Federation environmental projects are related to an Coastal Area Integrated Management Plan produced with EC Life funding. Several of these projects address land based pollution, particularly in the Neretva delta region.

Natural and cultural heritage protection

As with the ambient environment, legislation and administration for nature conservation varied in detail between each of the republics of the former Yugoslavia (Jancar 1987; Fisher 1990; European Parliament Directorate- General for Research 1991; IUCN 1991b; Terselic and Juras 1991). In outline, however, the situation in Bosnia corresponded to that elsewhere, in that day-to-day management of protected sites and areas was delegated to a local level (to municipalities and often to individual enterprises) and overall control was exercised through a tripartite relationship between local authorities, the responsible ministries and to the quasi-autonomous Institute for the Protection of Cultural, Natural and Historic Heritage *Zavod za Zaštitu Kulturnog, Historijskog i Prirodnog Naslijeđa BiH*.

Inevitably, there is an absence of empirical data on the effects of the war on wildlife. Effective monitoring has yet to begin. One significant achievement has been the publication of a national botanical Red List covering the whole of BiH. This was commissioned in 1990 by the Ecological Society of BiH, and compiled under siege conditions during the war using literature and herbarium sources; it was finally published in 1996 (Silic 1997). The list covers

all vascular plant groups (pteridophyta and spermatophyta) and comprises 678 species registered according to the old IUCN threat categories, including 8 Extinct or probably so; 43 Vulnerable, 289 Rare and 52 Insufficiently known. Preparatory work has also begun on vertebrate groups.

Only a total of 281 km² of the country receives any legal protection as conservation sites and protected landscape. This is equivalent to only 0.55% of the land surface. This is the lowest proportion of all the former republics of SFRJ. The greater part of this total - just over 250 km² - is comprised of just five areas (the National Parks of Sutjeska and Kozara; the Jahorina and Trebević Nature Parks, and the Perućica Primeval Reserve). The remaining 250-odd sites are individually very small.

As in other former Yugoslav republics, the two national parks were declared by the Republic Assembly under their own acts, *Zakon o Nacionalnom parku Sutjeska* and *Zakon o Nacionalnom parku Kozara*, however of the two national parks (both now in RS), only Sutjeska had a formally constituted managing authority (and staff). Lower - tier areas such as Regional Parks and Nature Reserves were established by lower bodies, latterly under the the 1985 Framework Act for the protection and use of cultural historic and natural heritage *Zakon o zaštiti i korišćenju kulturnoistorijskog i prirodnog nasledja*, by regional and municipal authorities in collaboration with the Institute for Protection of Cultural and Natural Monuments and Natural Rarities (683/54).

Regional and town authorities were also able to declare lower levels of protected landscape. For all these categories, levels of protection procedures were variable. Management and administration, although nominally the responsibility of municipal authorities, was in practice often delegated to scientific or commercial enterprises. The natural resource of some areas was also commercially exploited and protected status used as a vehicle for this process. An example is Hutovo Blato nature reserve in the Neretva delta was formally administered by an Experimental Farm belonging to the Ministry of Agricultural Economy (Singleton 1985). Hutovo Blato was also let annually by the municipality of Čapljina via a tourist organisation to Italian bird hunters (Terselic and Juras 1991). In addition to these locally run areas, a small number of strict (non intervention) reserves, mainly of *Picea omorica* Panc were designated by the Forest Authority.

All these areas were in existence prior to 1991 since when legal protection has been largely in abeyance, administrative structures have collapsed and little effective management or monitoring has taken place. Major problems include the lack of funding, of qualified individuals capable of undertaking the work, of effective communication between entities and of access to critical sites. For example, the most recent survey data for Perućiča forest - arguably the most significant natural area in BiH - is from 1984.

However there are signs at least some activity in both entities. Both National Parks (Kozara and Sutjeska) are in RS and have been included in a DM 5 million appeal for funding for reconstruction and repair of places of culture, with sums identified as necessary for rehabilitation, of DM 774,500 for Sutjeska and DM 532,000 for Kozara (Government of the Republic of Srpska 1999).

Within the Federation there has been a revival of proposals for the extension of the protected area system already under discussion before the war: these include two riverine areas (the source and upper reaches of the rivers Una and Sans) and several mountain areas (Treskavica, Prenj, Čvrsnica, and Vranica). (Terselic and Juras 1991). If all these pre-war proposals were to be realised the total, although double the present area, would still be little over 1% of the total country. Under a new Law on Physical Planning *Zakon o prostornom uređenju*, a Spatial Plan for the Federation to the Year 2000 has been produced

under which it is proposed to designate up to 16% of the land surface. One proposal is for a new national park of almost 1000km² or just under 2% of the land surface of BiH, focused on Prenj, Čvrsnica and Čabulja. However there is some scepticism whether any of these proposals will be implemented, at least in the short term.

In addition to national parks and nature reserves, several other areas, have (or had) the status of recreational and conservation areas under city structural plans. For the most part these are merely formal designations, inherited from the former, pre-1991 system. In Sarajevo however they formed part of the plans for post-war regeneration developed during the siege which have recently been given new impetus by the institution of an Olympic Committee to prepare a bid for Sarajevo to host the 2010 Winter Olympics. The proposal includes the Igman and Bjelašnica mountains, the site of the 1974 Winter Olympics where skiing resumed again in 1998. Here, the woodlands remain largely unfelled, despite the chronic shortages of fuel during the war. Jučan, Trebević and Jahorina were by contrast were heavily felled by soldiers during the war and the wood sold to city dwellers at high prices. The consequence has been major erosion and landslips. Jahorina and Trebević remain heavily mined. Since the proposed area for the new park straddles the two entities (and on the Republika Srpska side is the area from which the bombardment of Sarajevo was controlled) the significance of these proposals is as much political as environmental (and if achieved, would be as great as the obstacles to doing so).

A significant development is that the governments of both entities are already beginning to consider the development of tourist strategies. In RS, attempts are being made to raise funding for the rehabilitation of skiing centres on mount Jahorina, and of spa facilities in Višegrad, Teslić, Bijeljina, Dubica, Laktaši and Srebrenica; to attract game hunters in state designated hunting areas and to use other natural features (especially fishing and rafting in the upper Drina) as tourist attractions. Logistic difficulties, as well as the all too obvious destroyed houses and other reminders of ethnic cleansing around the Muslim 'safe haven' of Srebrenica make it unlikely that these attempts will result in significant revenue - from aid agencies or from tourists - in the near future. However, in Sarajevo and (to a lesser extent) in Mostar, recreational commercialism has already begun. In addition to services provided for foreign aid personnel and their families there has begun a significant but steady trickle of more 'conventional' tourists (a significant proportion of them, it seems, attracted as spectators of the destruction of the heritage of these cities).

One of the features of the conflict was the destruction - often deliberate - of cultural and historic buildings. The destruction of property was not just collateral damage; architecture, as one of the more enduring manifestations of cultural heritage, was often deliberately targeted by both sides (Herscher1998). The wanton and unnecessary destruction at the height of the fighting by Croat irregulars of the ancient bridge in Mostar (which had no military significance but did serve as a footbridge for civilians between the 'Croat' west and the 'Muslim' east of the city), has become an enduring image - captured in film footage - of the war. In Serb (as in many Croat) nationalist areas there has been a systematic destruction of mosques; in many Muslim areas, Orthodox churches have been a target of fire and stand empty and derelict. An unpublished 1995 report issued by the Institute for the Protection of Cultural, Historical and Natural Heritage in Sarajevo documents damage to 1,115 mosques, 309 Catholic churches, 36 Serbian Orthodox churches (this last figure is almost certainly an underestimate) and 1,079 public buildings. In a few cases this has 'merely' undone restoration to buildings which were already severely damaged during the Second World War. Many cultural monuments however have been irreparably destroyed. Such is the case with the Jewish Library, one of the most significant cultural assets of pre-war Sarajevo. In the case of some other of the most notable public

buildings and monuments (for example the National Library in Sarajevo) repairs have already begun, usually funded by outside organisations.

In Sarajevo too, whilst most of the suburbs (particularly around the airport) remain empty, the old central bazaar area of the town shows almost no signs of the three years of shelling. Almost all the mosques have been repaired (and several new ones built), clearly with no shortage of external funding. Within a limited area of perhaps a square kilometre the market area of Sarajevo has become a tourist centre again replete with trinket shops and though the tourists are almost all now foreign military, humanitarian and advisory personnel. New 'heritage' interpretation (Carter et al. 1995) is a feature of reconstruction. Pavement grenade blast scours have been levelled with red plastic filler to mark the spots where people died from Serb nationalist shelling from the surrounding hills, which overlook the city. Meanwhile Gavrilo Princip's footprints on the Latin Bridge (where the spark, which ignited the First World War was struck) have been removed and the bridge renamed, as have many other streets. At the time of writing a major outcry has prevented the proposed removal of a monument (untouched by shelling during the siege), to the liberation of Sarajevo by partisan troops in 1945.

Ironically it is damage to the religious artifacts, much more than to the living places and economy of Bosnia that have caught the attention of (and simulated action amongst) international funding bodies. Some of the destruction suffered has been compounded by 'wholly inappropriate new construction by NGOs using concrete blockwork and red tile roof finish' (Barakat 1997). At deeper level some of the (doubtless equally well-intentioned) activity of outside bodies reveals the historic complexity beneath the symbolic simplicity of cultural heritage. An example is Počitelj, a small historic town on the banks of the Neretva. Although there was little collateral damage from actual fighting, after the exclusion of the Muslim population (and their replacement by Croat refugees) the mosque was deliberately blown up. The mosque and town have become the focus of an action-research project based at the Post-War Reconstruction and Development Unit (PRDU) at the University of York (UK) Institute of Advanced Architectural Studies, funded by the World Monuments Fund, and the (US) Samuel H Kress Foundation ("Revitalisation of Pocitelj; a" 1997). A vacation study of the town by students on the University's MA course in Post-war Recovery Studies, focused on the need to safeguard the remains of the mosque (and of other traditional Islamic buildings) pending possible reconstruction (Barakat and Wilson 1997). The probable existence of much older (Orthodox Christian) remains below the mosque was seen as a 'complicating' factor, and one of less importance than the continuing occupation of the town by Croats, who would be as unlikely to regard with favour the rebuilding of the mosque as they would any repair and display of the earlier Orthodox remains. The destruction to the cultural heritage has raised more acutely in Bosnia than elsewhere the perennial problem of all 'heritage' reconstruction, that it is always in part "an arbitrary exercise in cultural memory, is always a question of what to save, what to put back, what to take apart" (Wilson 1992: 235). Although institution of a Commission on the Protection of National Monuments was one of the requirements of the Dayton accord, but there has to date been no action.

Civil society and non-governmental organisations

A feature of former Yugoslavia including BiH was the strong tradition of non-governmental organisations (NGOs). These included scientific societies and amenity organisations as well as sporting societies and (most importantly, in an environmental context) the alpine clubs, which were active at a variety of different levels from local and municipal groups to regional and national organisations. The work of many of these NGOs was supported, both directly and through support to particular projects and initiatives, by the

BiH government and/or municipal administrations. The more 'scientific' NGOs, in particular, often had close links with universities as well sometimes with ministries.

Important groups that were active at a local level included the Country Museum *Zemaljski muzej* and other organisations particularly active in cultural heritage and species protection. More explicitly political bodies included, notably, the River Una Protection *Society Društvo za stvaranje kulture č uvanja i zaštite rijeke Une*, based in Bihać. The latter, known popularly as the 'Emeralds of Una' *Unskih Smaragda* claimed a membership of some 112,000 members immediately prior to the war. A feature of the 'Emeralds' was its work with young people, for which it was awarded the UN 'Global 500' Charter medal. This it returned during the war in protest against the UN's ineptness and inertia particularly with regard to the suffering of children who bore the brunt of the conflict. The Greens of Zenica, *Zeleni Zeniča* another local body, also continued to work during the war, but their activities were restricted to the local level and had little effect (Gjigas 1997). More recent environmental campaigning has been initiated by loosely formed local groups on specific issues. One example is local opposition to proposals to dam the Neretva river to create a hydroelectric power installation near Konjic. Another is action by residents of Doboj who organised a petition (1999) on pollution of the river Spreča (from which the Banja Luka water supply also comes) arising from factories in the Tuzla region (REC and Japan Special Fund 1999).

Subsequent to the end of the war, other bodies such as the Environmental Protection Union *Savez za zaštitu i unapredjenje čovjekove okoline BiH* and the Green Alliance *Savez Zelenih BiH* have been formed but activities are mostly restricted in effect to large towns in Federation areas. The most influential of currently active organisations, the Foundation for Sustainable Development and Quality of Life *Fondacija za podisticanje uravnoteženog razvoja i kvaliteta života*, FONDEKO, was founded in 1994 to initiate Agenda 21 initiatives. Its management board includes prominent academics as well as businesses and utilities; it has already produced several educational texts for high school pupils and has had a regular 30- minute radio slot. In 1996 FONDEKO founded a quarterly colour magazine, *FONDEKO SVIJET* (Fondeko World) as a 'scientific- popular revue on nature, people and ecology' excellently produced with all articles with a short English summary (see Abadzic 1997); in early 1988 it organised a conference on the future of protected areas in the Republic. The organisation (like several other NGOs) has its own web site. Other significant organisations include the Sarajevo based ECO-BiH, an umbrella body coordinating a number of local organisations, and BETA, the Bosnian Environmental Technology Association, whose activities have included the encouragement of organic farming (with a certification scheme and demonstration fields in FBiH and RS), and a summer camp for students on mount Vranica, where participants worked on plans for sustainable use of local natural and human resources. Usually these organisations depend on the initiative and energy of a handful of individuals who may have academic affiliations; thus ECO-BiH is associated with the Centre for Ecology and Natural Resources at the Science Faculty, and BETA with the Faculty of Agriculture at Sarajevo University. Other organisations may be more political in nature; for example in mid-2000, the Banja Luka based *Eco-Movement RS* provided the basis for the establishment of the RS Green Party.

Overall, the number and level of activity of NGOs in BiH is, understandably, low but is nevertheless growing. A survey carried out in late 1996 by the Sarajevo office of the Regional Environmental Centre (REC, Gjigas 1997) secured only 10 completed returns of questionnaires distributed to 38 NGOs in the Republic. The number of active environmental NGOs was estimated at 15, around half of them based in Sarajevo and all but three formed after 1990. Most respondents defined themselves either as grassroots organisations or as associations of environmental professionals. None had any full- time paid staff. Some half of the groups surveyed were either dormant, defunct, or had moved with no forwarding

address. By mid 2000, REC estimated that some 100 plus NGOs were active across BiH and RS, with more than 150 funded projects. Such growth is only partly to be attributed to the funding activity of external agencies (including REC): it is also a measure of a growing level of environmental awareness and of the potential of environmental activism as a non-partisan focus for civic action.

Conclusions: the future

Continuing political and ethnic conflicts and divisions in Bosnia make it difficult to avoid partisan analyses of even environmental issues. It has not been the purpose of this chapter to analyse the causes of the recent conflict in BiH, much less to allocate blame between the protagonists. Two things are clear, however: first, that the war itself was a tragedy not only for the country's people but also - directly and indirectly - for its environment, natural and cultural; second, that its consequences will dominate the future for many years to come. Nationalism, the lack of a developed civil society and effective oppositional politics in BiH comprise the flip side to poverty, dependency and isolation; both are obstacles to environmental progress. At the same time, the environment has provided a focus for some of the most positive post conflict developments; Within Stability Pact arrangements for South-East Europe, the Regional Environmental Reconstruction Programme (REReP) now plays a prominent role, linking environmental remediation to the (re)construction of civil society. Recent growth in NGO activity, the likelihood in the near future of all BiH framework environmental legislation and a widespread awareness – within and without BiH of the quality of its natural resources provide hopeful signs for the future.

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