


The Environment in Your Pocket 1 - 2008

CROATIAN ENVIRONMENT AGENCY

THE ENVIRONMENT IN YOUR POCKET

The Environment in Your Pocket I – 2008

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Editorial Board:
Savka Kučar Dragičević
Mira Zovko

Prepared by:
Tanja Babić
Iris Bostjančić
Melita Došen
Natalija Golubovac
Goran Graovac
Predrag Hercog
Tihomir Horvat
Branka Ilakovac
Anica Juren
Gordana Kolačko
Kristina Kružić
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Hana Mesić
Biserka Mladinić
Tihana Rončević
Bernarda Rožman
Vlatka Šomek-Gvožđak
Marijo Vranaričić

Translation:
Sabina Ekinović

Language editor:
Michael Gable

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Tiskara HIP, Zagreb

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Croatian Environment Agency
Trg maršala Tita 8, 10000 Zagreb, Croatia
Phone: ++ 385 1 488 68 40
Facsimile: ++ 385 1 488 68 50
E-mail: info@azo.hr |Internet: www.azo.hr

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THE ENVIRONMENT IN YOUR POCKET

Introduction

Dear readers,

Welcome to the fourth edition of our annual brochure, *The Environment in Your Pocket I-2008*, which offers you an overview of selected indicators of the state of the environment in Croatia.

This presentation of selected indicators for air, climate change, inland water, sea and coastal area, soil and agriculture, biodiversity, forestry, waste, energy, tourism, fisheries and transport is an attempt to inform both the professional community and the general public about the state of the environment and change trends, and to highlight the advances that have been made in data availability and quality.

Information about the environment is always of great interest. It is a key to informed decision-making, and is being made accessible to the entire population of the Republic of Croatia.

The Croatian Environment Agency has been recognized as a source of comprehensive, accurate and timely environmental data. Therefore, we have also decided to present an indicator that shows the number and breakdown of public inquiries addressed to the Agency in 2007.

We believe this brochure will contribute to a better understanding of the state of and changes in the environment, and that it will be used to achieve the goal of preserving and protecting the environment to which we all belong.

Croatian Environment Agency

THE ENVIRONMENT IN YOUR POCKET

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THE ENVIRONMENT IN YOUR POCKET

Croatia – Basic Data

Mainland surface area	56 594 km^2
Territorial sea surface area	31 067 km^2
Coastline length	5 835.3 km
Islands, rocks, reefs	1 185
Highest mountain summit	Mt. Dinara 1 831 m
Counties	21
Cities and municipalities	550 (124 and 426, respectively)
Population	4 437 460
Population density per sq. km	78.5
Agricultural households	448 532
Populated islands	47
Language	Croatian
Alphabet	Latin
Political system	Parliamentary democracy
GDP per capita in 2007	EUR 8 445

AIR

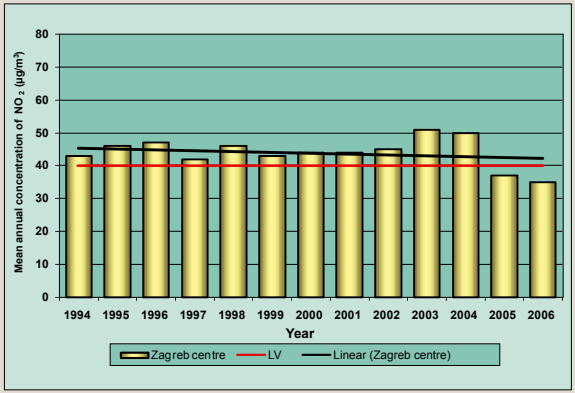
Mean Annual Concentration of Nitrogen Dioxide for the City of Zagreb

Man-caused emissions of nitrogen dioxide (NO_2) are generated by burning fuels at high temperatures (motor vehicles, large industrial plants, district heating plants and incinerators). Increase in NO_2 concentration in the air is one of the best indicators of air pollution from transport.

Trend and current state

In Croatia, emissions of NO_2 are monitored in eight stations of the National Air Quality Monitoring Network (Zagreb-1, Zagreb-2, Zagreb-3, Sisak-1, Kutina-1, Osijek-1, Rijeka-1 and Rijeka-2), in local network stations (city and county), and in special-purpose stations. The mean annual concentrations of NO_2 for the City of Zagreb are presented using values measured between 1994 and 2004 at the local air quality monitoring station in the city centre, and the values measured at the National Network Station Zagreb-1 in 2005 and 2006. The data recorded during the period under consideration indicate a slowly decreasing trend, which corresponds with an increase in the number of vehicles fitted with catalytic converters.

Mean annual NO_2 concentrations in Zagreb centre, 1994-2006



Source: CEA

AIR

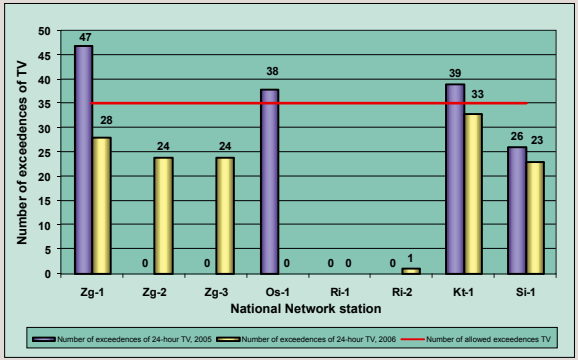
Number of Exceedences of Tolerant Values (TV) of Particulate Matter PM_{10}

Particulate matter less than 10 μm in diameter poses a risk for public health since it penetrates and resides in airways of the human body, causing inflammatory changes and reducing resistance to allergies and infections. Because of its significant public health effect, particulate matter PM_{10} is one of the most important air pollution indicators. Emissions are mostly generated from fuel combustion in non-industrial furnaces, road transport and industry.

Trend and current state

Emission of PM_{10} was monitored at four (in 2005) and eight (in 2006) stations of the National Permanent Air Quality Monitoring Network. The measurement data for 2005 show a considerable level of pollution, with total of 124 exceedences of tolerant values (TV) in three stations (Zagreb-1, Osijek-1, Kutina-1). The measured values place air at these stations in the third category, while air at one station (Sisak-1) is in the second category. Data for 2006 show that air was in the second category at five National Network Stations (Zagreb-1, Zagreb-2, Zagreb-3, Kutina-1, Sisak-1), and in the first category at the three remaining stations (Rijeka-1, Rijeka-2, Osijek-1).

Number of exceedences of tolerant values (TV) of PM_{10} at the National Permanent Air Quality Monitoring Network Stations, 2005 and 2006



Source: CEA

CLIMATE CHANGE

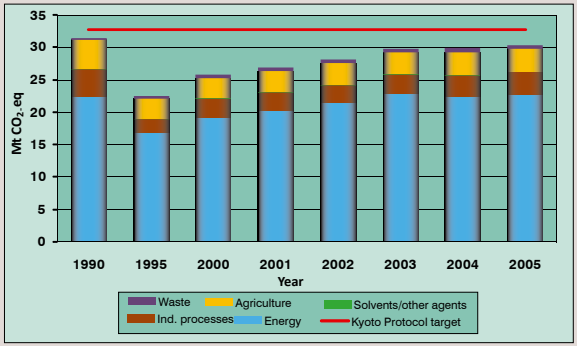
Greenhouse Gas Emissions

Human activities cause a significant increase in greenhouse gas emissions. Carbon dioxide (CO_2) accounts for the major share of greenhouse emissions from human activities and process facilities. Other emissions include methane (CH_4), nitrogen dioxide (N_2O), hydrogen fluorocarbons (HFC), perfluorocarbons (PFC) and sulphur hexafluoride (SF_6).

Trend and current state

Croatia ratified the Kyoto Protocol in 2007. It thus undertook to reduce its greenhouse emissions by 5% by 2012 compared to the base year 1990, when emissions totalled 34.64 Mt CO_2-eq (million tons of carbon dioxide equivalent). In 2005, total greenhouse gas emissions excluding removal by sinks was 30.5 Mt CO_2-eq, which is 3.4% less compared to 1990. Between 1990 and 2005, CO_2 comprised 77.3% of total greenhouse gas emissions with, NO_2 at 11.8%, CH_4 at 9.7%, and HFC at 0.1%. In 2005, CO_2 emissions increased by 1% compared to 1990, while removal of this greenhouse gas by sink increased by 24%. The largest increase in CO_2 emissions was recorded in the energy sector (transport, electricity consumption, heating) and industry (particularly in mineral production).

Greenhouse gas emissions by sectors (Mt CO_2 - eq), 1990-2005



Source: MEPPPC

Year	1990	1995	2000	2001	2002	2003	2004	2005
Total greenhouse gas emission	31.55	22.58	25.84	26.97	28.19	29.86	30.03	30.48
Waste	0.30	0.38	0.48	0.50	0.53	0.56	0.64	0.58
Agriculture	4.46	3.10	3.13	3.24	3.28	3.32	3.56	3.50
Solvents & other agents	0.08	0.08	0.07	0.08	0.10	0.11	0.14	0.16
Industrial processes	4.21	2.14	2.87	2.83	2.75	2.89	3.25	3.44
Energy	22.50	16.87	19.29	20.33	21.53	22.99	22.44	22.81

INLAND WATER

Nutrients in Rivers

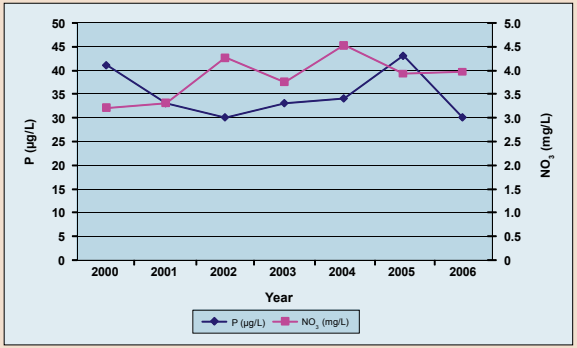
Orthophosphates (expressed as P) and nitrates (NO_3) are nutrients necessary for the growth of algae and other freshwater plants. An increase in the quantities of nitrates and phosphorus in freshwaters could cause eutrophication resulting in the degradation of a river's ecological status, i.e. water quality. Increased phosphorus (P) concentration in water is a consequence of urban wastewater pollution. An increased concentration of nitrates is caused by nutrient leaching from agricultural land.

Trend and current state

In the period 2000-2006, orthophosphate and nitrate concentrations in rivers recorded at representative stations in Croatia that carried out measurements according to the provisions of the *Regulation*[1] showed no noticeable trends. Considering the content of nutrients in freshwaters, the state of Croatian rivers is generally good. However, problems with nutrient contamination have been detected in some locations, generally in the Sava River district, and in the Drava and Danube river districts.

1 Regulation on Water Classification (OG 77/98)

Median of annual average concentration values of total orthophosphate (μg P/L) and nitrate (mg NO_3/ L) in rivers, 2000-2006



Year	2000	2001	2002	2003	2004	2005	2006
P (μg/L)	41	33	30	33	34	43	30
NO_3 (mg/L)	3.2	3.3	4.3	3.7	4.5	3.9	4.0

Source: Croatian Waters

INLAND WATER

Oxygen Consuming Substances in Rivers

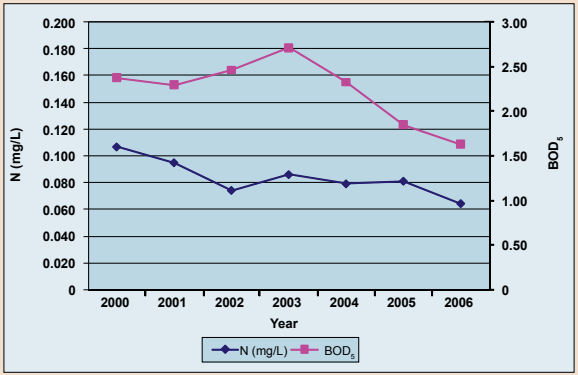
The key parameters of oxygen content in waters are total ammonium (mg N/L) and biochemical oxygen demand (BOD_5). High values of these indicators are signs of organic pollution that has a number of adverse effects on the aquatic environment, including a decrease in oxygen concentration affecting the biodiversity of aquatic ecosystems and the degradation of water quality. The most obvious consequence of oxygen decrease in rivers is fish kill. The primary causes of organic pollution are untreated urban and industrial wastewaters.

Trend and current state

In the period 2000-2006, ammonium and BOD_5 values in rivers taken in samples from representative stations in Croatia which conducted river monitoring according to the provisions of the *Regulation*[1] showed no noticeable trends. According to the *Regulation*[1] these values classify rivers as in a very good and a good state, but for the final classification by quality classes (I - V) a number of other parameters have to be considered. A quality assessment is made separately, using the following groups of indicators: oxygen regime, nutrients, microbiological and biological indicators.

1 Regulation on Water Classification (OG 77/98)

Median of annual average concentration values of total ammonium (mg N/L) and BOD_5 (mg O_2/L) in rivers, 2000-2006



Source: Croatian Waters

Year	2000	2001	2002	2003	2004	2005	2006
N (mg/L)	0.107	0.095	0.074	0.086	0.079	0.081	0.064
BOD_5	2.38	2.30	2.47	2.72	2.33	1.85	1.63

INLAND WATER

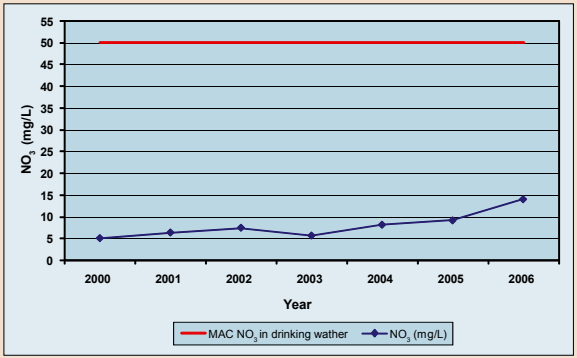
Nitrates in the Zagreb Aquifer Groundwater

An increase in nitrate (NO_3) concentration is mainly a consequence of nutrient leaching from agricultural land. In Croatia, 90% of the water for public supply is extracted groundwater, while a smaller percentage of the population (about 24%) is connected to private supply sources (local waterworks, private wells, etc.) that are not included in the water quality control system. Monitoring nitrate concentration trends is of particular importance since the increased presence of nitrate in drinking water could adversely affect public health.

Trend and current state

A nitrate concentration increase trend was recorded in the period 2000-2006, when groundwater quality was monitored at the stations in the Zagreb aquifer according to the provisions of the *Regulation*[1]. Nitrate concentrations measured in groundwater (5–14 mg NO_3/L) are still considerably lower than the maximum allowable concentration of 50 mg NO_3/L stipulated by the *Ordinance*[2]. In monitoring the concentration increase trend, the time span needed for nitrate to travel from the surface to the groundwater should be taken into account. This time span, might be up to 40 years, depending on soil type and bedrock.

Median of annual average concentration values of nitrate [mg NO_3/L] in the Zagreb aquifer groundwater, 2000-2006



Source: Croatian Waters

1 Regulation on Water Classification (OG 77/98)
2 Ordinance on Sanitary Quality of Drinking Water (OG 182/04)

SEA AND COASTAL AREA

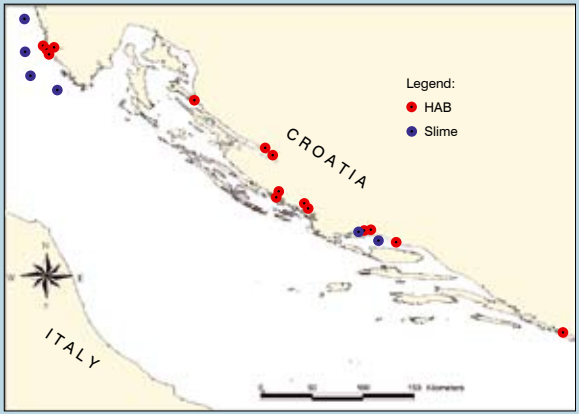
Harmful Algal Bloom in the Adriatic Sea

Algal bloom is the excessive and rapid reproduction of phytoplankton stimulated by excessive nutrients in the sea, which occurs either naturally or through pollution. Decomposition of dead phytoplankton depletes the oxygen, and slime extracted by phytoplankton from group diatomea blocks the gills of marine organisms, causing their death or migration. The sea becomes unattractive for swimmers (*slime*), and blooming of some sorts of dinoflagellates paints the sea red (*red tide*). An increase in the share of flagellates in the sea (particularly of the gender *Dinophysis*) causes a release of toxins that affect marine organisms and, because they build up in shellfish and fish, could be harmful to people.

Trend and current state

Between 2000 and 2006, the eastern parts of the Šibenik and Kaštela bays were the most exposed to the red tide and monospecific bloom. Slime deposits frequently occurred in the northern part of the Adriatic Sea, and more rarely in smaller amounts in the waters of the central and southern Adriatic.

Spatial distribution of hazardous algal bloom in the Adriatic Sea, 2000-2006



Source: IOF Split

SEA AND COASTAL AREA

Quantity Assessment of the Ecological State of Transitional, Coastal and Marine Waters - Trophic Index

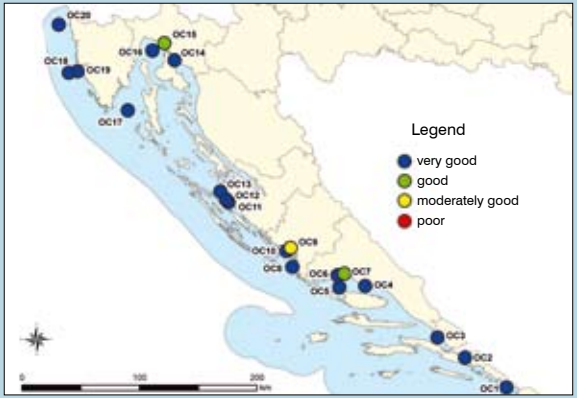
The trophic index is used for the presentation of quantity assessment of the ecological state of transitional, coastal and marine waters. According to the trophic index value range (1 to 8), four ecological state classes of the sea (eutrophication) are determined and depicted in different colours: very good state (oligotrophic) – blue, good (mezotrophic) – green, moderately good (eutrophic) – yellow, and poor (extremely eutrophic) – orange. Deterioration in the ecological state of the sea is most frequently caused by wastewater pollution, leaching from agricultural land, and deposits of airborne pollution. The natural characteristics of the area (geology) could also contribute to a worsening of the ecological state.

Trend and current state

Between 2003 and 2006, the ecological state of transitional, coastal and marine waters was generally assessed as very good based on the trophic index value (between 2 and 4). The best ecological state was recorded in the Kvarner region, and the worst in the Bakar Bay, Vranjic Basin and Sibenik Bay, although the ecological state of these areas was assessed as good. The situation in Sibenik Bay worsened during 2006. It was ultimately assessed as moderately good. Since there is no national regulation on the classification of the coastal sea, an appropriate *Italian law*1[1] was used for the purpose. However, it is necessary to increase the number of stations in order to get more accurate information about the trophic state.

1 Italian Water Act (D.LGS.152/99)

State of transitional, coastal and marine waters with regard to eutrophication level (surface layer, 0 to 10 m), 2006



Source: IOF Split, RBI - CMR Rovinj, IMCR Dubrovnik

SOIL AND AGRICULTURE

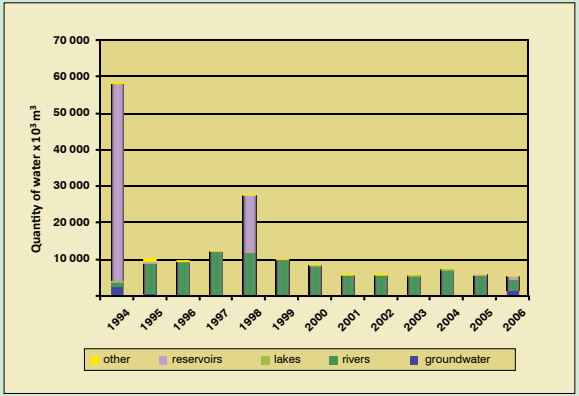
Water Abstraction by Agriculture

This indicator presents the annual quantity of surface and groundwater used directly in agriculture for irrigation. A common source of water for irrigation is surface waters – rivers, lakes, reservoirs of different size, and groundwater in some cases.

Trend and current state

Croatian hydro potential is exceptionally high, but the quantities of water used for irrigation in agriculture are very low. It is estimated that about 4 056 ha (0.34% of arable and 0.47% of sown land) was included in irrigation schemes in 2006. The data also points to a permanent trend of a decrease in water use for irrigation. Thus, in 1994 annual water use for irrigation was 37 650 m^3/ha, while in 2006 it was only 1 320 m^3/ha. In 1994, agricultural land was generally irrigated using water from reservoirs and to a small degree by tapping groundwater, using water from rivers, lakes and other sources. In 2006, water for irrigation was mostly tapped from rivers; a smaller portion was groundwater, water from reservoirs and other sources, while water from lakes was not used.

Water use in agriculture, 1994-2006



Source: CBS

SOIL AND AGRICULTURE

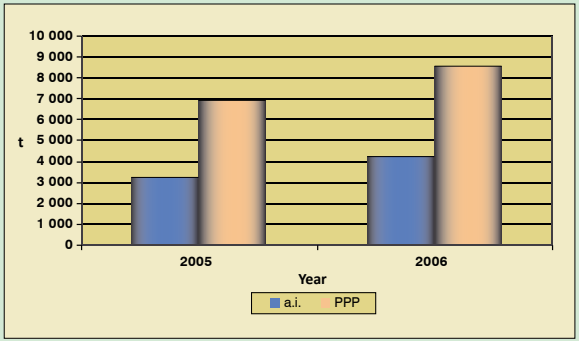
Consumption of Plant Protection Products

The unprofessional and excessive application of plant protection products (PPP) on plants, plant products or soil poses a health risk to people and animals, and affects the environment. Plant protection products differ by the degree of risk they pose, which depends on the essential properties of the active ingredient (a.i.) and method of their application.

Trend and current state

Plant protection preparations can only be placed on the Croatian market with the approval of the Ministry of Agriculture, Forestry and Rural Development. Since data on the application of plant protection products on arable land is inadequate (about 1 210 000 ha), the indicator has been developed on the basis of a sum of PPP import quantities and quantities of PPP produced for the local market, presuming all imported and produced quantities are applied to cultivated land. The calculation has not accounted for exported or stored (unused) quantities since no adequate records are available. An assessed average use rate for plant protection products for 2005 and 2006 was 5.7-7.1 kg PPP/ha or 2.7-3.5 kg a.i./ha, based on the equation: consumption/ha = import + production for local market/arable land.

Estimated use of PPPs, 2005 and 2006



Source: MAFRD and CBS

SOIL AND AGRICULTURE

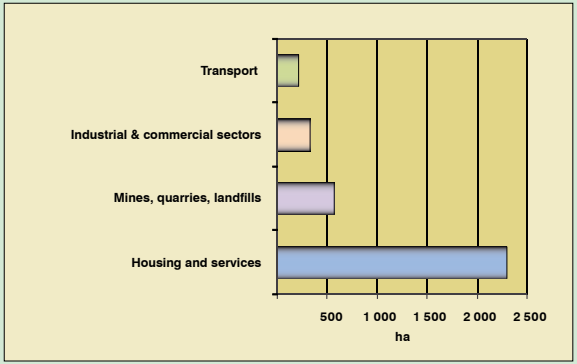
Agricultural Soil Sealing

Land use change by soil sealing using impermeable materials results in land take. This process causes a reduction in soil permeability, increases the risk of erosion, floods, water contamination, disturbed gas and nutrient cycles, difficulties in pollutant degradation and a decrease in biodiversity.

Trend and current state

According to the maps created for CLC Croatia 2000, 4 587 ha of land was up taken between 1990 and 2000, of which 3 420 ha of agricultural land (342 ha per year on average). The main drivers of agricultural soil sealing by impervious materials were building projects in the housing and services sector, with 2 295 ha. The second driver was mining, quarrying, and landfill development with 568.97 ha of sealed agricultural soil. Development of the industrial and commercial sector, and the construction of road infrastructure resulted in the sealing of an additional 336.65 ha of soil, of which 219.81 ha was agricultural land.

Agricultural soil sealing drivers, 1990-2000



Source: CEA

BIODIVERSITY

Protected and Strictly Protected Species

A key to the survival of living creatures on the Earth is biodiversity. A reduction in the number or the extinction of a population affects the entire food chain. The consequences are far reaching and cannot be predicted. Species must be protected in order to ensure the stability of the ecosystem.

Trend and current state

The permanent negative effect of human activities threatens numerous species and has brought them to the verge of extinction. The permanent loss of such species degrades the quality of life. The main threats to which species are exposed include: changes in their habitats (destruction, degradation, fragmentation), exploitation, import of foreign species, presence of invasive species, pollution and changes in weather conditions. Protective measures (ban on collecting, picking, export of species, etc.), as stipulated by the *Ordinance*[1], are aimed at ensuring favourable conditions for wildlife, which means distribution and sufficient population within natural fluctuations, and maintaining population stability trends. The Croatian list of protected and strictly protected species includes 5 582 native and domesticated species.

1 Ordinance on Wild Taxa Designation as Protected and Strictly Protected (OG 7/06)

Number of protected and strictly protected species in Croatia

GROUP	STRICTLY PROTECTED SPECIES	PROTECTED SPECIES
Vascular plants	809	331
Fungi	314	3 486
Mammals	50	24
Birds	326	3
Reptiles	37	6
Amphibians	15	6
Freshwater fish	68	25
Marine fish	5	-
Butterflies	26	14
Dragonflies	32	5
TOTAL	1 682	3 900

Source: MC

BIODIVERSITY

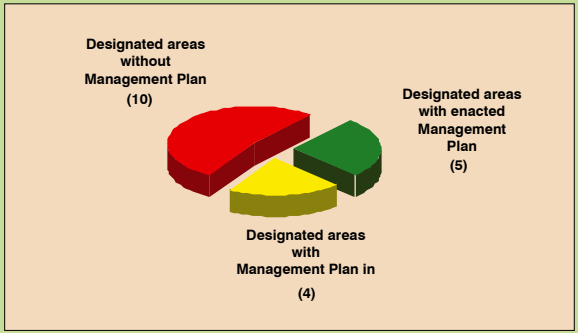
Designated Areas (National Parks/Nature Parks) Management

A designated area Management Plan is an approved technical document that describes a designated area and its ecological, geographical, geological, landscape and other characteristics. The plan is the basic document for the implementation of protection and preservation measures to be applied to individual natural assets in a designated area, with due consideration of the needs of the local population. The Management Plan is prepared for a ten-year period and presents comprehensive information obtained by systematic research studies of the designated area.

Trend and current state

So far, five Management Plans have been developed for the Croatian designated areas, including Risnjak, Plitvice Lakes, Northern Velebit, and Paklenica National Parks, and Mt. Velebit Nature Park. The plans for the nature parks Mt. Medvednica, Kopački Rit, Mt. Učka and Lonjsko Polje are in preparation, while the Management Plans for ten designated areas falling in the national park category (Island of Mljet, Kornati Archipelago, the Krka River and the Brijuni Islands) and the nature park category (Island of Lastovo, Mt. Biokovo, Vransko Lake, Telašćica Cove, Mt. Papuk and Samobor-Žumberak Range) have not yet been prepared.

Management Plans for Croatian designated areas, 2007



Source: CEA

FORESTRY

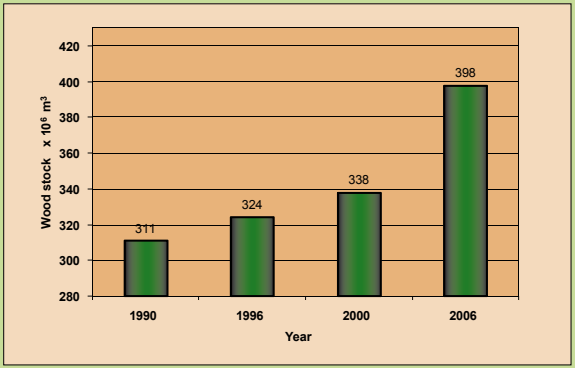
Sustainable Forest Management

The sustainable management of forests contributes to the preservation of habitats, which is a condition for the preservation of biological diversity. The sustainable management of forests results in a wood stock increment without the degradation of natural assets and without disturbing the structure of the forest ecosystem.

Trend and current state

Almost 47% inland territory of Croatia is forested. Croatian forests are natural structures of natural origin, with some valuable habitat types. Only 2% of forest land is under artificial cultivation and plantation of fast-growing species and conifers. The preservation of the natural structure of the forests ensures their sustainable management. Annual felling never exceeds the wood stock increment. In forest regeneration, cultivation practices that simulate natural processes are implemented. Indigenous seed gene material is used. Protection products are used rationally. Croatian forests have been awarded a prestigious international FSC certificate, and the Ecological Network system is most frequently implemented in the forest areas.

Wood stock in Croatia, 1990-2006



Source: CEA

FORESTRY

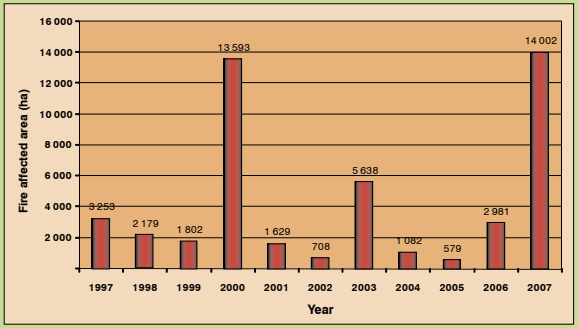
Fire-Affected State-Owned Forests

Fires cause numerous ecological changes: loss of habitats, a decrease in biodiversity, and an increased risk of erosion and groundwater contamination due to the loss of topsoil and an increase in carbon dioxide (CO_2) emissions.

Trend and current state

Fires mainly break out along the forest-covered coastal and island areas dominated by vulnerable pioneering pine vegetation and different degraded forest forms, such as maquis and garigue. The beauty of the landscape along the Adriatic coast and islands is a tourist attraction, so forest fires have an adverse effect on both nature and the local population. Although Croatia is taking the necessary steps to improve methods for fire detection and prevention by investing in infrastructure and equipment, it still experiences many forest fires every year. In 2000, 13 593 ha of area under forest were affected by fires. The following years recorded a decrease in the forest fire trend. Still, in 2007, a record was hit with 14 002 ha of state-owned forest land affected by fires. This confirms a need for intensified awareness and the education of the local population and tourists about fire risks since the fires are started most frequently by people.

Fire-affected state-owned forest areas.
1997-2007



Source: MRDFWM

WASTE

Waste Management Plans

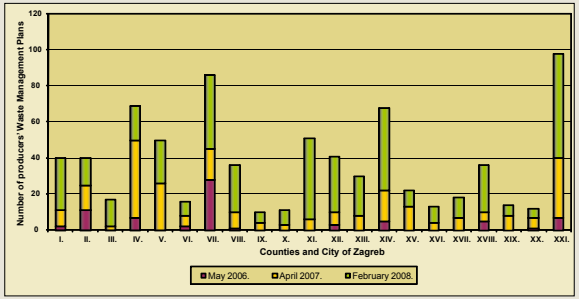
The number of completed Waste Management Plans is an indicator of progress made in the organized and sustainable management of waste. The Plans must include projections of the generation of individual types of waste and offer solutions for adequate waste disposal. They are the basis for the recognition and implementation of adequate measures aimed at waste reduction and prevention, and for the determination of optimum models of waste recycling and disposal.

Trend and current state

The *Act*[1] stipulates the preparation of national and regional (county) plans, local (city and municipality) plans and plans to be prepared by producers generating more than 150 t of non-hazardous waste and over 200 kg of hazardous waste per year. By February 2008, such Waste Management Plans had been adopted by eight counties and a few cities and municipalities. Waste Management Plans had also been prepared by 641 business entities. In May 2006, the Croatian Environment Agency received 72 Waste Management Plans from producers. This number increased by 247 in April 2007. The data indicate that 778 Waste Management Plans have been prepared by producers by February 2008. The largest number of companies that have prepared Management Plans come from the City of Zagreb, Bjelovarsko-Bilogorska County, Karlovačka County and Osječko-Baranjska County.

1 Waste Act (OG 178/04)

Waste Management Plans prepared by waste producers



Year	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.	XII.	XIII.	XIV.	XV.	XVI.	XVII.	XVIII.	XIX.	XX.	XXI.
May 2006.	2	11	0	7	0	2	28	1	0	0	0	3	0	5	0	0	0	5	0	1	7
April 2007.	11	25	2	50	26	8	45	10	4	3	6	10	8	22	13	4	7	10	8	7	40
February 2008.	40	40	17	69	50	16	86	36	10	11	51	41	30	68	22	13	18	36	14	12	98

Source: CEA

WASTE

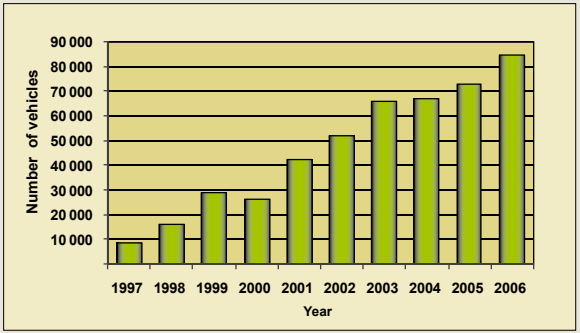
End-of-Life Vehicles

End-of-life vehicles are vehicles that are scrapped, intended to be scrapped, or must be scrapped by their owners for damage, wear or other causes. Since such vehicles contain antifreeze and brake and other fluids, they could cause environmental pollution. The number of end-of-life vehicles is constantly increasing, and it is necessary to ensure adequate management of this type of waste, particularly of their component materials – metals, plastics, glass and rubber, which are suitable for recycling.

Trend and current state

An increase in the standard of living causes an increase in the manufacture and import of vehicles. In 1997, records show 21 cars per 100 persons, while in 2007 the number increased to 32. In 2007, 1 435 781 vehicles were registered, of which 79 133 weighing a total of 140 500 t were imported. The average age of a personal car in Croatia is 10 years. Between 1997 and 2006, the number of end-of-life vehicles increased tenfold. In 2006, it totalled 84 420 vehicles. A new *Ordinance*[1] enacted in 2007 introduced a new end-of-life car management system. Sixteen companies were licensed for vehicle collection, and two for treatment and recycling. In 2007, the licence holders reported 7 915 t of collected and 2 787 t of recycled vehicles, while in year before the *Ordinance*[1] was enacted, 9 205 t of collected and 4 332 t of recycled scrap vehicles had been reported in the Environmental Emission Register (EER).

End-of-life vehicles, 1997-2006



Source: CEA and CBS

1 Ordinance on End-of-Life Vehicles Management (OG 136/06)

WASTE

Waste Oil

Waste oil could be either hazardous (waste lubricating oils) or non-hazardous waste (waste edible oils). There are numerous possibilities for their reuse, so collection needs to be intensified. Such an approach will result in less environmental pollution, particularly the contamination of water. One of objectives set up by the *Strategy*[1] is the reuse/recycling of 90% of waste oil by 2010.

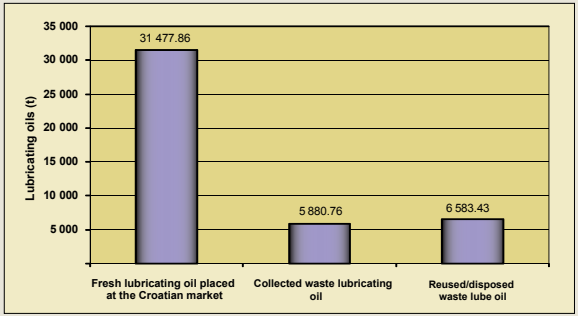
Trend and current state

In 2007, which was the first year of the *Ordinance*[2] enforcement, 5 880.76 t of waste lubricating oil was collected and 6 583.43 t reused or disposed of. During the same year, 31 477.86 t of fresh lubricating oil was reported and placed on the market (36 294.05 t produced and imported, 4 816.19 t exported). It is estimated that the reported fresh lubricating oil will generate about 50% of waste lubricating oil. Pursuant to the conditions stipulated in the *Ordinance*[2], 1 396.36 t of waste edible oil was collected and 1 252.79 t reused and disposed of in 2007. These data were reported by 20 operators licensed for collection and 11 for reuse and disposal of waste lubricating oil, and 10 operators licensed for collection and 3 for reuse and disposal of waste edible oil.

1 Waste Management Strategy of the Republic of Croatia (OG 130/05)
2 Ordinance on Waste Oil Management (OG 124/06)

In comparison, in 2006, 15 292 t of collected and 13 563 t of treated waste lubricating oil, and 1 486.08 t of collected and 360.10 t of treated edible oil was reported to the EER. The exact quantity of waste oil collected, reused and disposed of in 2007 will be known after the data reported by the licensed operators to the EER have been analyzed.

Lubricating oil quantities, 2007
(data acc. to the *Ordinance*[1])



Source: CEA and EPEEF

ENERGY

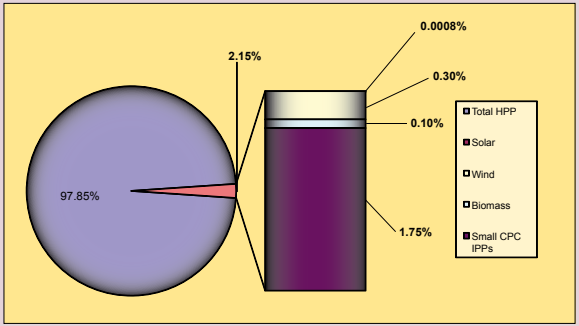
Renewable Energy Sources

Compared to power generation based on the burning of fossil fuels, power generation from renewable sources reduces greenhouse gas (CO_2) emissions and emissions of other pollutants (SO_2, CO, H_2S, NOx, particulate matter, and heavy metals). However, plants generating energy from renewable sources - hydroelectric power plants, wind parks, and solar plants have an environmental impact on landscape, habitats and ecosystems.

Trend and current state

Electricity from renewable sources accounts for 52% of the total electricity available in Croatia. A breakdown of renewable electricity sources shows that 97.85% are large and small hydroelectric power plants (HPP) owned by *Croatian Power Company* (CPC), 1.75% are hydroelectric power plants owned by IPPs, 0.10% plants generating electricity from biomass, 0.30 % are wind parks, and only 0.0008% are solar plants.

Renewable electricity sources, 2006



Source: MELA and HPEI

ENERGY

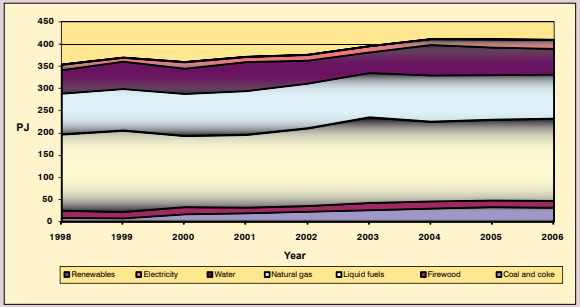
Total Primary Energy Supply

A higher level of development in a country means higher energy demand. Depending on its form, energy could have a higher or lower environmental impact. Cleaner energy forms are: natural gas, water power and wind.

Trend and current state

In 2006, total energy supply in Croatia decreased slightly by 0.3% compared to the previous year. Energy from harnessed hydro power and the consumption of coal, coke and natural gas decreased. The consumption of renewable sources, imported electricity, liquid fuels and firewood increased. Although the contribution of renewable energy sources to the total energy supply is low, a major increase (20.20%) in supply was recorded from these sources. Liquid fuel consumption increased by 1.8%, and firewood consumption by 3.5%. Hydrological conditions in 2006 caused a decrease of 6.8% in hydro power availability. There was also a by 4.1%, decrease in coal and coke consumption and a 1.2% decrease in natural gas consumption.

Total primary energy supply, 1998-2006



Izvor: HPEI

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006
Total energy supply (PJ)	353.95	369.70	359.62	371.58	376.23	395.93	412.04	411.66	410.56

ENERGY

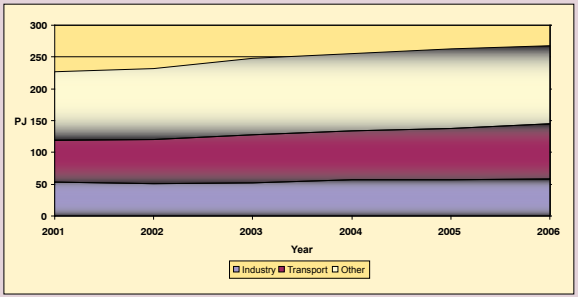
Total Primary Energy Supply by Sectors

Total primary energy supply meets gross energy demand on a power system. This indicator gives an overview of total energy supply in three characteristic sectors: industry, transport and other sectors.

Trend and current state

In 2006, energy consumption in the industrial and transport sectors increased by 3% and 6.2%, respectively, compared to the previous year. Consumption in other sectors, including households, agriculture and the building sector, decreased by 1.7%. Between 2001 and 2006, the energy use trend in all sectors was on the increase. Thus, an average annual increase in energy consumption was 5.4% in transport, and 2.7% in other consumption, while industrial energy consumption increased at an average annual rate of 2%.

Total primary energy supply by sectors, 2001-2006



Source: HPEI

Year	2001	2002	2003	2004	2005	2006
Industry	53.38	51.1	52.39	57.15	57.16	58.86
Transport	65.77	69.35	74.88	77.17	80.67	85.63
Other sectors	107.81	111.57	120.21	121.23	125.51	123.4
Total primary energy supply by final customer sectors (PJ)	226.96	232.02	247.48	255.55	263.34	267.89

ENERGY

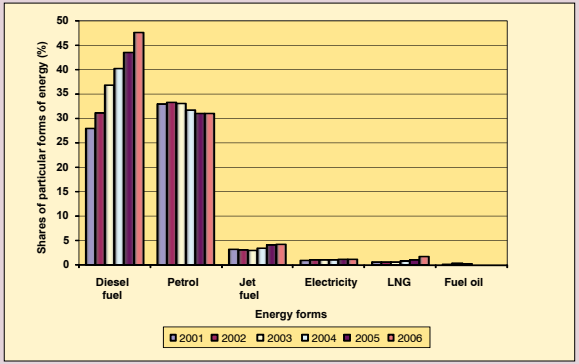
Individual Energy Form Shares for Final Energy Customers in Transport

This indicator shows shares of different energy forms for final energy consumption in transport. The energy forms most commonly used in transport include diesel fuel, petrol, jet fuel, electricity, liquefied natural gas (LNG) and fuel oil.

Trend and current state

In 2006, total energy consumption in transport increased by 6.2% compared to the previous year. A faster consumption increase trend continued for diesel fuel, as clearly indicated by the 9.4% increase. The petrol consumption decrease trend was interrupted in 2006, when a minimum increase in petrol consumption of 0.1% was recorded. Between 2001 and 2006, annual consumption of diesel fuel increased at a very high average annual rate of 11.2%, while petrol consumption decreased at an average annual rate of 1.2%. The increase in LNG in recent years is particularly interesting. In 2006, the LNG consumption rate increased by as much as 67% compared to the previous year, while the average annual rate during the period under consideration was 24%. Jet fuel consumption increased by 3.5% in 2006, and its consumption rate increase was 5.9% during the period under consideration. In 2006, electricity consumption in transport decreased by 0.6%, however between 2001 and 2006 its average annual increase rate was 2.7%.

Shares of particular forms of energy for final energy customers in transport, 2001-2006



Source: HPEI

TOURISM

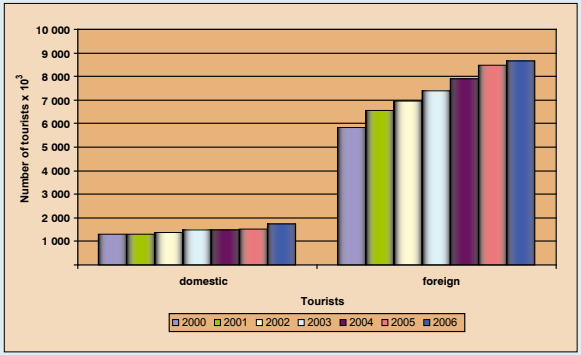
Tourist Arrivals in Croatia

This indicator follows the trend of domestic and international tourist arrivals in Croatia, and consequential environmental load caused by their visits. It also highlights the importance of the tourist sector and its growth, which is particularly important for economic development.

Trend and current state

Between 2000 and 2006, a constant increase in the total number of tourists was recorded. In 2006, the number of domestic tourists increased by 12.9%, while the number of foreign tourists rose by only 2.27% compared to the previous year. Data for the entire period under consideration shows that the number of domestic tourist arrivals increased at an average annual rate of 5.38%, while the number of foreign tourist arrivals increased at an average rate of 8.08%.

Tourist arrivals in Croatia, 2000-2006



Source: CBS

TOURISM

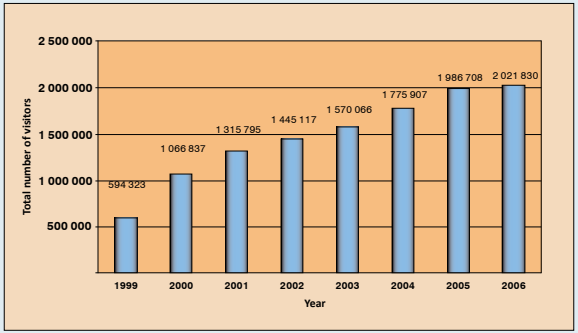
Tourism in Designated Areas

Natural phenomena and the beauty of designated areas are the reasons for the development of tourism. However, tourism also includes business activities that might have an adverse effect on the natural world (construction of infrastructure, excessive numbers of visitors, etc.).

Trend and current state

Tourist activities in designated areas make natural assets more attractive and contribute to an increase in knowledge and environmental awareness. They are important for the business sector and create jobs for the local population. An increase in the number of visitors leads to increases in wastewater, waste, pollution, noise, and visual changes of landscape. All of this could impact organisms, population rates and the quality of habitats. Measures need to be taken for the preservation of biodiversity. Between 1999 and 2006, the total number of tourists in designated areas increased, particularly in the national parks. The largest number of tourists was recorded in 2000 and 2001. Five management plans developed for the designated areas (the national parks of Plitvice Lakes, Risnjak, Paklenica, Northern Velebit and Mt. Velebit Nature Park) were the first to clearly define park use zones.

Total number of tourists in national parks, 1999-2006



Source: CBS and CEA

FISHERIES AND AQUACULTURE

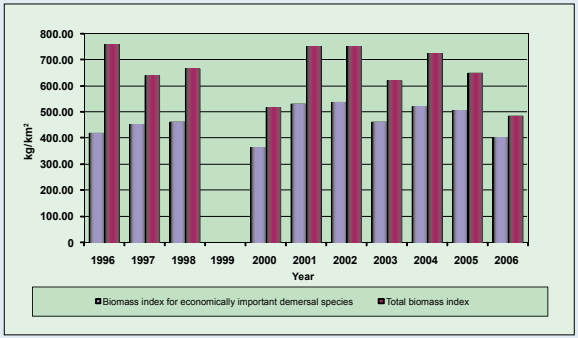
Marine Organisms Biomass Index Trends

Biomass is the total mass of individuals within the same species, population, taxonomic group of organisms or biocenosis by unit of area or volume of a habitat. It is an assessed quantity of organic material in a given area that indicates the productivity of that area. The biomass index indicates trends in the stocks of specific species.

Trend and current state

The biomass index trend for demersal species was monitored between 1996 and 2006 on the basis of data collected for Croatian territorial waters and for individual fishing zones during the EU-MEDITS expedition. In presenting the biomass index trend for important demersal species, the catch was analysed of target species: hornet octopus and musky octopus, European hake, mullet, sea bream and shrimps. Until 2000, and with the exception of 1999, for which no data are available, the total biomass index trend for all demersal species in Croatia's territorial waters was decreasing. The index changed to an increase in succeeding years. However, during the last two to three years, the total biomass index trend for all demersal species has again been on decrease, particularly the biomass index for economically important demersal species which show significant annual fluctuations. Such an index is a consequence of intensive fishing activities and changes in hydrogeographic conditions that play an important role in the reproduction and survival of organisms in their early life, particularly species whose biological characteristics make them more sensitive to exploitation.

Marine organisms biomass index trends, 1996-2006



Source:IOF, Split

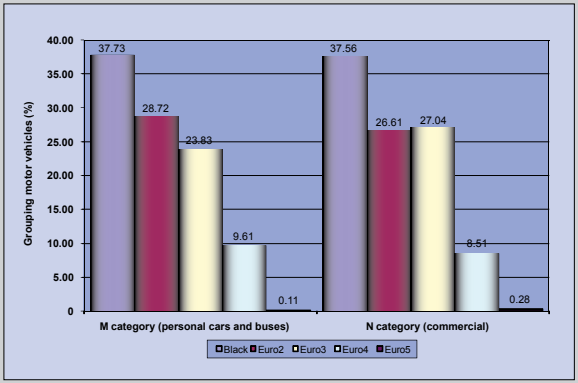
TRANSPORT
Grouping Vehicles of M and N Categories According to Emission Standards

In order to mitigate environmental pollution from transport, the European Commission stipulates emission standards (Euro 1, 2, 3, 4 and 5) which define the maximum allowable emission of gases from motor vehicles. This indicator shows how motor vehicles in Croatia are grouped according to those emission standards. Category M vehicles are passenger cars, and category N vehicles are commercial vehicles.

Trend and current state

The so-called "black cars", for which there are no type-approval exhaust gas limit values, are still dominant in Croatia. These engines constitute more than one third of M and N category vehicle fleet. In the more demanding engine emission categories, there is a lower number of engines meeting the standards, particularly Euro 4 and Euro 5. About 70 000 new passenger cars that meet the emission requirements according to Euro 5 standard are purchased every year. This is a negligible number compared to the total number of vehicles. Thus, it is obvious that the renewal of the Croatian vehicle fleet is a rather slow process.

Grouping vehicles of M and N categories according to emission standards for engines or vehicles by exhaust gas criterion, 2005



Source: CVC

PUBLIC RELATIONS

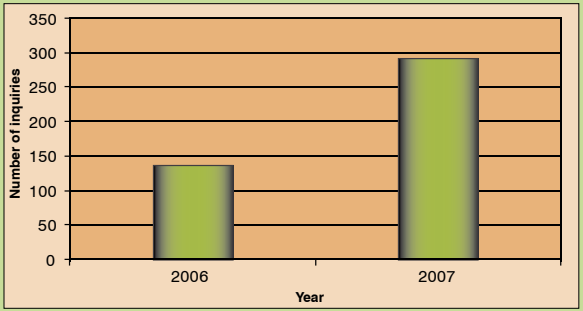
Number and Breakdown of Public Inquiries Addressed to the Croatian Environment Agency in 2007

Pursuant to Croatian regulations that provide for public access to environmental information, the Croatian Environment Agency has published information on its web site and in an *Information Catalogue*.

Trend and current state

In 2007, the Agency received 292 requests seeking 364 items of information and data, which is a 110% increase compared to the previous year. Regarding the topics of the requests, there was no change in trend since the most common requests were for data on waste (71%), air (8%), sea and water (4%), and soil (2%), while the lowest interest was shown for sectoral impacts and biodiversity (1% and 0.8%, respectively). A comparison of applicants confirms the previous practice, which means that most requests (46%) were submitted by private companies wishing to start or which had already started their business in some form of waste collection and/or treatment activities. The general population is highly aware of environmental issues, as confirmed by the fact that 21% of inquiries were received from members of general public and 4% of inquiries were received from NGOs. It is interesting that the number of requests for information received from international institutions and companies also increased (8%). However, the number of applications submitted by the professional community decreased (6%). The bottom of this scale is reserved for state-owned enterprises and public institutions with 1% each.

Number of public inquiries addressed to the Croatian Environment Agency in 2006 and 2007



Source: CEA

THE ENVIRONMENT IN YOUR POCKET

ACRONYMS AND ABBREVIATIONS

a.i. – Active ingredient
CEA – Croatian Environment Agency
CBS – Central Bureau of Statistics
CLC – Corine Land Cover
CVC – Croatian Vehicle Centre
CPC – Croatian Power Company
EER – Environmental Emission Register
EPEEF – Environmental Protection and Energy Efficiency Fund
GDP – Gross Domestic Product
GHG – Greenhouse Gases
HAB – Harmful Algal Bloom
HPEI – Hrvoje Požar Energy Institute
IMCR – Institute for Marine and Coastal Research, Dubrovnik
IOF – Institute of Oceanography and Fisheries, Split
IPPs – Independent Power Productions
LNG – Liquefied natural gas
LV – Limit value
MAC – Maximum Allowable Concentration
MAFRD – Ministry of Agriculture, Fisheries, and Rural Development
MC – Ministry of Culture
MELE – Ministry of Economy, Labour and Entrepreneurship
MEPPPC – Ministry of Environmental Protection, Physical Planning and Construction
MRDFWM – Ministry of Regional Development, Forestry and Water Management
NGO – Non – governmental organization
PJ – (Peta Joule) 10^{15} Joules
PM_{10} – Particulate matter less than 10 μm in diameter
PPP – Plant Protection Products
RBI-CMR – Ruđer Bošković Institute, Centre for Marine Research, Rovinj
TV – Tolerant value

Active ingredient – A substance or micro-organism (including viruses) with a general or particular effect on harmful organisms or on plants, plant parts and plant products.

Ambient air quality monitoring – Systematic measurement and assessment of the pollution level based on its spatial and temporal distribution.

Annual felling – Permissible amount of timber stock cut in cubic meters.

Aquifer – A subsurface layer or layers of rock or other geological strata of sufficient porosity and permeability to allow either a significant flow of groundwater or the abstraction of significant quantities of groundwater .

Assessment – Relevant method used for measurement or evaluation (calculation, forecasting) of the pollution level.

Biological diversity – Overall diversity of life on Earth, which encompasses genetic (variation within species), species, and ecosystem (habitat) diversity.

CLC Croatia *(CORINE Land Cover Croatia)* – A project that resulted in the creation of a digital land cover database based on CORINE nomenclature. It is consistent and homogenous with the data from the entire European community. The land cover data, combined with other topical data, provide a new insight into the condition and changes in natural resources in different sectors, such as agriculture, forestry, regional physical planning, natural resources stocktaking and environmental monitoring.

Demersal species – Marine organisms that live on, or in close proximity to, the seabed or depend on it.

Domesticated species – A species whose evolution has been influenced by humans to meet their needs.

Ecological network – A system of interrelated or geographically close and ecologically important areas whose balanced biogeographic distribution contributes considerably to preservation of a natural balance and biological diversity.

THE ENVIRONMENT IN YOUR POCKET

Glossary

Ecosystem – A basic functional unit in nature consisting of biotic and abiotic factors, which includes organisms and habitats interacting through matter cycling and energy flow.

Emission – Liquid, gaseous or solid substances discharged or leaked from a source into the environment.

EURO Standard – A standard that stipulates the maximum emission of exhaust gases for vehicles sold in Europe aimed at mitigation of the environmental pollution from transport.

Eutrophication – Enhanced primary production of organic matter due to excessive supply of nutrients.

First (I) category ambient air quality – Clean or slightly polluted air with no pollutant exceeding the limit value (LV).

FSC – *The Forest Stewardship Council* – An international organization established to promote the environmentally responsible, socially useful and economically viable management of world forests by setting a standard recognized through the responsible forest management principle.

Habitat (Biotope) – An area unit of an ecological system characterized by a specific complex of ecological factors, such as abiotic (light, temperature, humidity), climate (altitude, slope) and biotic (food chain, symbiosis, parasitism, predation) factors.

Habitat fragmentation – A process of emergence of discontinuities in a natural landscape resulting in the creation of smaller isolated fragments with a smaller population, which frequently results in the extinction of species. Habitat fragmentation is caused by human activities (forest clearance, land take, construction of roads, canals, settlements, etc.)

Habitat type – All habitats of the same kind. Habitat types are created as a result of geographical position, climate, hydrology, and geology and soil.

Invasive species – Non-native species which, unlike native species, invade areas which are not their natural habitats. They evolved elsewhere and, intentionally or intentionally, moved to a new habitat.

Limit value (LV) – Level of pollution below which, according to the current scientific knowledge, direct adverse effects on public health and/or the environment as a whole are unlikely. Once reached, this value must not be exceeded.

M category vehicles – Motor vehicles used for the transport of passengers, with a minimum of four wheels, categorized by vehicle type-approval.

Management Plan – A document that determines development guidelines, method of protection implementation, use and management of protected natural resources, with due consideration of the needs of the local population.

Monospecific bloom – Blooming of single species.

N category vehicles – Motor vehicles used for commercial transport, with minimum of four wheels, categorized by vehicle type-approval.

Native (Indigenous) species – Species that occur naturally in a given ecological system or area.

Natural fluctuation – Fluctuation of an environmental parameter (e.g. temperature, precipitation, species population, species vitality, community composition and other) between maximum and minimum values.

Pioneer species – Opportunistic species that initially occupy a bare or disturbed area, starting a new biological succession.

Plant Protection Products – Chemical compounds formulated specifically for plant and plant products protection against harmful organisms or to prevent their activity.

Pollutant – Any substance released or introduced into the air by direct or indirect human activity that has an undesirable effect upon the public health, the quality of life or the quality of the environment.

Population – A group of individuals of one species, occupying a defined area, which has an actual or a potential possibility of reproduction.

Recycling – Any process of waste treatment for material reuse or energy production.

Glossary

Renewable energy sources – Energy sources not depleted in energy production, including hydropower, solar energy, wind energy.

Second (II) category ambient air quality – Moderately polluted air with one or more pollutants exceeding the limit values (LV) but with no pollutants exceeding the tolerant values (TV).

Secondary pollutant – A pollutant not directly emitted, but which forms when other pollutants react in the atmosphere.

Sink – A process, activity or mechanism by which greenhouse gases, aerosols or greenhouse gas precursors are removed from the atmosphere (e.g. photosynthesis in plants).

Soil acidification – A collective term for processes causing the accumulation of hydrogen ions in soil due to ion losses from basic elements (primarily calcium and magnesium). Man-caused acidification by acid rains and intensive fertilization by natural and synthetic fertilizers is happening in all soils.

Stock – Stock includes individuals of the same species occupying a particular area, with common genetic material, which rarely mix with individuals from other areas.

Sustainable forest management – A forest management method according to which only a quantity equal to or less than the annual wood stock increment is economically exploited. The timber-growing stock thus remains unchanged and even gradually increases.

Sustainable management – A management method by which a balance is achieved between the economy and ecology resulting in preservation of natural assets of the Earth and their preservation for future generations.

Third (III) category ambient air quality – Excessively polluted air when one or more pollutants exceed the tolerant value.

Tolerant value (TV) – A limit value increased by margin of tolerance.

Type-Approval of Motor Vehicles – Testing and compliance assessment of tested parts based on *Ordinance on Type-Approval of Motor Vehicles* (OG 57/07) and European

ordinances and directives regulating tested parts and a specific category of motor vehicles.

Wood stock increment – Increase in tree size during a period of time.

Regional organization of the Republic of Croatia - Counties – Numerical identification and regional organization established by the *Act of Territories of Counties, Cities, Towns and Municipalities in the Republic of Croatia* (OG 86/06):

I. Zagrebačka County based in the City of Zagreb,
II. Krapinsko-Zagorska County based in Krapina
III. Sisačko-Moslavačka County based in Sisak
IV. Karlovačka County based in Karlovac
V. Varaždinska County based in Varaždin
VI. Koprivničko-Križevačka County based in Koprivnica
VII. Bjelovarsko-Bilogorska County based in Bjelovar
VIII. Primorsko-Goranska County based in Rijeka
IX. Ličko-Senjska County based in Gospić
X. Virovitičko-Podravska County based in Virovitica
XI. Požeško-Slavonska County based in Požega
XII. Brodsko-Posavska County based in Slavonski Brod
XIII. Zadarska County based in Zadar
XIV. Osječko-Baranjska County based in Osijek
XV. Šibensko-Kninska County based in Šibenik
XVI. Vukovarsko-Srijemska County based in Vukovar
XVII. Splitsko-Dalmatinska County based in Split
XVIII. Istarska County based in Pazin
XIX. Dubrovačko-Neretvanska County based in Dubrovnik
XX. Međimurska County based in Čakovec
XXI. City of Zagreb: the capital of the Republic of Croatia is a separate and unique territorial and administrative unit. Its organization is regulated by the Act on the City of Zagreb. The identification number is used to facilitate data presentation.

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CROATIAN
ENVIRONMENT AGENCY